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OUR WESTERN OFFICE AT DENVER, COLO.

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TWO COLLIERY EXPLOSIONS IN GREAT BRITAIN.

Within a week there have been two fearful explosions of fire damp—one in a Scotch Pit near Glasgow on the 8th inst., and another in an English Colliery.

A telegram of the 9th makes the following report:

"Twelve miners have been rescued, and seventeen are still in the pit, but it is not expected that they will be alive when reached. The rescuers have thus far been prevented from reaching them because of frequent explosions. At a late hour last night the Glasgow colliers were still entombed, and there was no hope of rescuing any of them."

On the 12th, another explosion occurred, and was reported by cable, the next day, as follows:

"A terrible colliery explosion occurred in the Unity Brook Pit, Kearsley, near Bolton, at 1 o'clock Tuesday afternoon. The mouth of the pit was blocked until 6 o'clock, when explorers succeeded in entering. At last accounts they had found sixteen corpses. About forty men were working in the pit at the time of the explosion, and it is certain that all perished."

A little later we were advised:

"All the corpses of the miners who were at work at the time of the explosion, forty-four in number, have been recovered from the Kearsley Colliery."

No doubt the English mines are better managed and better ventilated than they were a few years ago, yet we hear far too often of just such "accidents" as these. It is probably impossible to prevent, absolutely, explosions of fire damp in cases where "blowers" are met with, but it *is possible* to ventilate mines so efficiently that a serious explosion cannot occur, and the sooner this fact is recognized the better. Well planned ventilation, careful supervision and strict discipline will prevent any considerable accumulation of fire damp in even the most fiery mine. The fact that most of the great explosions occur in mines which do not produce large quantities of gas, shows that it is carelessness and lack of discipline, rather than "blowers," that cause them.

THE COST OF COAL TRANSPORTATION IN ENGLAND.

The Great Eastern Railway proposes building a railway line from the Yorkshire coal pits to London and to charge a farthing (say ½ cent) per ton per mile transportation. At present it costs 4s. 3d. per ton freight by sea from the Tyne to the Thames, and 7s. 2d. per ton, exclusive of city dues, by the Great Northern Railway from South Yorkshire to London. By another railway the present charge to London is 8s. 3d. per ton, including the dues, with 1s. a ton for trucks, 1s. for lighterage and 11¼d. for landing, while breakage, according to Mr. COCKERILL, should be put down at 1s. 7d. per ton, giving a total of 12s. 9¼d.

It is now proposed by a Mr. Thompson to use screw colliers, with end to end hatches and steam cranes, for the ocean route, and deck lighters and steam tugs for the rivers Ouse, Trent and Humber. The coal to be filled in sacks in the lighters; the handling thereafter being of sacks. Mr. Thompson, the proposer of the scheme, estimates the cost as follows:

Freight, 1s. 10d. per ton; sacks, 8d.; filling and stowing, 6d.; discharging, 6d.; landing, 6d.; city dues, 1s. 1d.; insurance and metage, 3d.; total, 5s. 4d., a saving over rail freights of 7s. 5¼d. It is, of course, not to be expected that the projector's figures will be attained in practice, but it seems possible that some saving could be made on the present cost, and a saving of even a few pence a ton would amount to a very large sum annually on the coal trade of London.

A METRICAL WIRE GAUGE.

Mr. WM. KENT recently published in the *American Manufacturer* a suggestion to simplify the wire gauge, which, as every one knows, is in a most deplorable state of confusion. The proposed scale is far simpler than either of those now in use and the thickness increases by millimeters and simple fractions of a millimeter. A simple inspection of the following table will show the advantages of this proposed gauge. It possesses some advantages not offered by either the report of the Committee of the American Institute of Mining Engineers or by Mr. BRIGGS, whose paper we concluded in our last issue.

NUMBER OF GAUGE.	Diameter Birmingham Gauge.		Diameter American Gauge.		Proposed Commercial Sizes.
	Inches.	Millemeters.	Inches.	Millimeters.	Millimeters.
0000	·454	11·532	·46	11·684	11·
000	·425	10·795	·40694	10·336	10·
00	·38	9·6519	·3648	9·266	9·
0	·34	8·6359	·32486	8·2511	8·
1	·3	7·6199	·2893	7·3481	7·
2	·284	7·2135	·25763	6·5437	6·
3	·259	6·5785	·22942	5·8272	5·5
4	·238	6·0451	·20431	5·1894	5·
5	·22	5·588	·18194	4·6212	4·5
6	·203	5·1562	·16202	4·1152	4·
7	·18	4·572	·14428	3·6647	3·5
8	·165	4·191	·12849	3·2636	3·
9	·148	3·7592	·11443	2·9065	2·75
10	·134	3·4036	·10189	2·588	2·50
11	·12	3·048	·090742	2·3048	2·25
12	·109	2·7686	·080808	2·0525	2·
13	·095	2·413	·071961	1·8278	1·80
14	·083	2·1082	·064084	1·6277	1·60
15	·072	1·8288	·057068	1·4495	1·40
16	·065	1·651	·05082	1·2908	1·25
17	·058	1·4732	·045757	1·1495	1·12
18	·049	1·2446	·040303	1·0237	1·
19	·042	1·0668	·03589	·9116	·90
20	·035	·88899	·031961	·8118	·80
21	·032	·81279	·028462	·7229	·72
22	·028	·71019	·025347	·64381	·64
23	·025	·63646	·022571	·5733	·56
24	·022	·55879	·0201	·51054	·50
25	·02	·508	·0179	·45466	·45
26	·018	·4572	·01594	·40487	·40
27	·016	·4064	·014195	·36055	·36
28	·014	·3556	·012641	·32108	·32
29	·013	·33096	·011257	·28593	·28
30	·012	·3048	·010025	·25463	·25
31	·01	·254	·008928	·22677	·22
32	·009	·2286	·00795	·20193	·20
33	·008	·2032	·00708	·17983	·18
34	·007	·1778	·006304	·16012	·16
35	·005	·127	·005614	·14259	·14
36	·004	·1016	·005	·127	·12
37	....	.....	·004453	·11311	·11
38	....	.....	·003965	.10071	·10
39	....	.....	·003531	.08969	·09
40	....	.....	·003144	·07986	·08

THE FUTURE OF AMERICAN COMMERCE.

Although the House of Representatives passed the Silver bill over the President's veto, as it had passed the same bill originally, under the gag of the previous question, a good many members succeeded in getting permission to print the remarks which they would have uttered if they had had opportunity. This arrangement is, on the whole, not to be lamented. The House has abundantly demonstrated that few of its members could contribute from their own wisdom or knowledge anything of value on this subject, and that nothing which the wisest could say in debate would arrest the avalanche of mingled design and delusion set in motion by demagogues and *doctrinaires*. In the face of such popular impulses, the average Congressman, free from the ordinary guidance which party lines afford, takes counsel of his own political interests, and, having decided on which side to stand, prepares a speech on that side by a process of eclectic "cramming" comparable to nothing but the way in which boys at English schools compose "Latin verses" out of the "tags" and phrases which have descended to them from their predecessors, or have been picked up, here and there, in classical authors.

There are exceptions to this rule. Occasionally, a man familiar with the applications of political economy in practical finance, presents a view of some public question which the *Congressional Record* ought not to be allowed to cover with oblivion. The speech of A. S. HEWITT, nominally

delivered on the 21st of February, fairly belongs in this class, and deserves a careful study.

Mr. HEWITT declares at the outset that "recovery from distress will be impossible until this bill is swept from the statute-book, as it will be within one year, by an indignant, deceived and outraged people." We do not know whether the original Bland bill or the bill with the Senate amendments is here intended. In the latter case, we cannot agree with the prophecy. Either causes apart from all legislation will produce some relief, deceptive or real, in which case the Silver party will undoubtedly claim the credit of it; or else there will come no relief, and the Silver party will charge the failure to the success of the "gold monopolists" in preventing free coinage and inflation. The indignant, self-deceived and outraged people will be likely, in that event, to sweep away, not the act, but the Senate amendments to it.

The speech continues with a very interesting and able discussion of the monetary conditions of France and England, upon which is based a forcible attack on the policy involved in the Silver bill, as calculated to postpone the only permanent prosperity of the United States by retarding the development of its foreign commerce, and especially by crippling this country in its approaching contest with England for the control of the commerce of the world. Mr. HEWITT shows:

1. That the Constitution, adopting both gold and silver as legal-tender money, provides that Congress "shall regulate the value thereof," thus recognizing the fact that the relative value of gold and silver fluctuates, and that mere legislation cannot permanently fix it, nor fix it at all against the laws of trade.

2. That our new policy involves a loss of money, as well as of credit, to the nation.

3. That the capitalists and "bondholders" of this country are, in reality, its workers.

4. That the cause of present distress is neither over-production, nor contraction, nor silver demonetization, nor impending resumption; but over-expenditure on the one hand and the lack of foreign markets on the other.

5. That the latter deficiency can be made good only by removing legislative obstructions. We quote a part (and wish we could quote more) of the argument under this head:

"Nature has clearly indicated that the commerce of the world will be as largely controlled in the future by the United States as now it is by Great Britain. The capacity for production is the fundamental basis upon which the structure of commerce must be reared. The possession of raw materials of the varied kinds required for all the branches of staple industry will surely secure the establishment and success of manufactures, provided the climate is favorable and the soil is occupied by an honest, intelligent and energetic race of people. In some respects Great Britain has enjoyed unusual advantages for the development of her industry, the extension of her commerce and for acquiring the control of the markets of the world. In the first place, she possesses a climate singularly favorable to physical development and active labor. How far the climate and her insular position have affected her national character let philosophers decide; but it is certain that, from some cause or causes, the English people during the last five hundred years have developed qualities of personal independence, of mental vigor, of untiring activity, of limitless acquisitiveness, which have no counterpart in any nation, ancient or modern. Hence to-day her rule extends over more than one-fifth of the surface, and includes more than one-fifth the entire population of the globe. And yet this enormous growth of political power has all occurred within two hundred years, and that vast accumulation of wealth, which excites the wonder and the envy of the world, has been built up to its great proportions within the last century. Its magnitude is simply stupendous, and passes the comprehension of ordinary rules of estimate. In 1801 the amount of national wealth was believed to be eighteen hundred millions of pounds sterling, equal to £112 per head of population. In 1841 it had risen to four thousand millions of pounds sterling, equal to £150 per head. In 1858 it was six thousand millions of pounds sterling, equal to £206 per head of population, while in 1877 it had reached eight thousand five hundred millions of pounds sterling, equal to £260 per head of population. The best authorities reckon the annual accumulations during the last ten years to have been at the rate of £235,000,000, of which £65,000,000 are derived from investments of British capital in foreign countries. In other words, if this sum were equally distributed among the inhabitants of Great Britain, the rest of the world is paying about $10 per head annually to each man, woman and child in the United Kingdom. Great Britain is therefore not only overflowing with riches at home, but she has secured a mortgage-lien upon the industry of the rest of the world, which practically absorbs a large portion of the profits of human industry.

"That this statement is true is proven by the fact that for a long period of years the imports of merchandise and bullion into Great Britain have largely exceeded the value of the exports. The table which I insert shows that during the last nineteen years the aggregate of balances of excess of imports over exports amounts to the enormous sum of £1,193,608,433.

"The percentage of this excess steadily increases on the average, and in the year 1876 it amounted to £125,968,263. That no portion of this vast value represented debts incurred abroad is proven by the fact that besides all the merchandise which she imported there was a balance received in bullion amounting to £7,590,000, and in two years of £13,230,000. Doubtless some part of this large excess was due to the collection of a portion of the indebtedness of foreign countries to Great Britain. And as confidence is restored it is possible that some portion of this fund may be again invested in foreign securities. But the broad fact remains that Great Britain every year draws from other countries in merchandise and in money a sum which is now sufficient to defray the annual expenses of her entire administration, including the interest on the national debt. It is not surprising, therefore, that the people of Great Britain have more of the comforts of life and suffer less from poverty than any other nation in the world. The present is an era of distress. Throughout the civilized globe the depression in business is universal, and the cry of suffering comes up from every land. How is it in England?

"My own personal observation during the summer of 1877 in France, Germany and England satisfied me that the condition of the working classes in England was less grievous and more comfortable than in either of the other countries or in the United States. Except in one branch of business, the manufacture of iron and steel, there was sufficient employment for the operatives; and although wages had been reduced they were still sufficient to maintain the working population in better case than here or elsewhere abroad. That this statement is true is clearly proven by the returns of the poor-law board as to the relief extended to paupers. The number relieved in 1875 was 30,000 less than in 1874; and in 1876, 56,000 less than in 1875. The cost of pauperism in 1868 was 6s. 11½d. per head of population, while in 1876 it was reduced to 6s. 8¼d. per head. Moreover for the first time in the present century the immigration into Great Britain was equal to the emigration from its shores, proving its ability to employ its population at a better rate of compensation than could be had in foreign countries. The explanation of this unexpected and almost incredible state of affairs is to be found in the fact that while her exports had steadily diminished in money value from 1872 to 1876, they had increased in actual quantity in every staple industry except in that of iron and steel. This is not only proved by the official returns but by the unmistakable evidence in the fact that the coal raised increased from 127,016,747 tons in 1873, which was the largest quantity up to that period, to 133,344,766 tons in 1876.

"In other words, more power had been employed in human ndustry than in any previous period of English history. As the result, therefore, of the British commercial system we have in an era of universal depression increase of employment, increase of income, increase of accumulated wealth and increase of population. Here, then, is presented a situation worthy of the study of statesmen. How and by what means has Great Britain placed herself in this enviable position at the head of the nations in industry, commerce, prosperity, wealth and empire?

* * * * * *

"Two hundred years ago the commercial superiority now enjoyed by Great Britain was possessed by Holland. How did Great Britain secure its transfer to her control? Doubtless navigation laws, protective legislation and warlike operations had more or less influence upon the result, but the rivalry continued without material advantage to either side, until the discovery of the steam engine. England had coal, while Holland had none. Moreover the coal fields were near to navigation. A slight expenditure for canals made is accessible to every portion of the kingdom. The steam engine multiplied the productive power of man. twenty-five fold. Previous to its introduction exchanges were made practically on the basis of one day of human labor for another day of human labor. The steam engine enabled England to purchase with one day's labor the produce of twenty-five days. Of course the competition of other countries not having access to coal became impossible, and the profits of her exchanges in foreign trade were enormously enhanced. This new source of wealth enabled Great Britain to maintain the wars with Napoleon and resist for awhile the introduction of new political ideas which have since regenerated the face of the world. Out of these wars she learned one lesson, however, which has governed her policy from that day to this, to expend her power and her influence for the extension of her trade and commerce and not for the propagation of political ideas. * * *

"British commerce being thus founded on her possession of exhaustless stores of power in her coal-beds, could not be disturbed or dislodged until other nations could secure equal access to stores of cheap fuel; and practically England secured the monopoly of the trade of the world long before other nations could make any progress toward substantial competition. The introduction of railways, however, was their release from bondage. It enabled them to get access to the sources of power; but England had got fifty years the start, and during that fifty years had gathered unto herself the bulk of the accumulated floating capital of mankind, and now that other nations are in a position to compete, having got access to fuel, having acquired skill, having perfected and established the best machinery for production, they find that the profits of trade are reduced to that narrow margin which is due to the superior ratural advantages of one country over another for special classes of products. * * *

"Political relations being in a satisfactory condition, English capital would flow naturally into this country whenever there is a vacuum, provided confidence in its security is not disturbed. Now, confidence is the offspring of honesty and judgment. Given a state of things wherein the basis for productive industry is sound, the judgment will be readily satisfied. It is not too much to say that unbounded confidence exists abroad in the productive capacities of the United States. Foreign capitalists appreciate our sources of wealth better than we do ourselves, because they have less than we possess. No other evidence is required of this fact than the vast sums, amounting to many hundreds of millions of dollars, which, in the period between 1865 and 1873, were sent from abroad to be invested in American enterprises, and it is largely to such investments that we have been enabled to establish throughout the length and breadth of the land convenient and economical communications between our coal fields and the sources of our food and raw materials, so that we may now compete upon equal terms with Great Britain for the commerce of the world.

"For this purpose, therefore—that is, the development of communications—no more capital is at present needed; but capital is still required for working up our raw material into manufactured products and for establishing lines of steam transportation between our ports and the natural market for these products on the Gulf of Mexico, in South America, and the regions of the Orient.

"Why does this capital withhold itself in alarm? For more than three years it has been so abundant in the great financial centres of the world that it has been difficult to make it earn even the lowest rate of interest ever known in financial history. The truth must be told. Foreign capitalists have lost confidence in our honesty. I shall not undertake to discuss whether there is good reason or not for this loss of confidence. I only deal with the fact, its causes and its consequences. We are a debtor nation. It has been held out that our obligations will be paid in gold. This proposition was not disputed so long as capital was flowing into the country from abroad; but when speculative enterprises collapsed in 1873 and values began to shrink, suggestions were made and parties organized for paying off the bonds in paper money and latterly in silver, which had in the mean time depreciated about 10 per cent. in value. Capital prefers to remain idle in security rather than to be employed where there is risk of loss. Hence the recovery which in the ordinary course of nature would have been produced by the transfer of floating capital into fixed investments has been retarded, and if such legislation as is proposed in the Bland silver bill and the repeal of the resumption act should be carried into effect, the time of recovery will be indefinitely postponed.

"Money, in the sense of currency, can be created by legislation, but capital can be created only by labor profitably employed. It is the fruit of labor. It is the result of saving. It must have a substantial pre-existence. It can be transferred by money, but money cannot be substituted for it. Capital is the freight; money is the vehicle on which it is carried. Therefore the creation of unlimited amounts of money will not secure the presence of capital any more than the building of thousands of railway cars will produce the freight which they are designed to move. What we want, therefore, is more capital and not more money. Confidence alone will bring capital; legislation cannot. In this question the West and the South have an interest vastly greater than any other section of the country. The West and South produce the food and the raw materials—cotton and wool—upon which our future development of industry must rest. This food and these raw materials are now carried to Great Britain, are there manufactured, and are thence transported to every portion of the habitable globe. There is no longer any good reason why the cotton should not be manufactured where it is grown, and the food transported from the West into the regions of the South, and the cotton of the South in like manner returned to the West, giving life to an industry so vast that we can only form a proper idea of its proportions by considering that it has enabled England to sustain a population of two hundred and sixty-five persons to the square mile, while in this country of superabundant food we maintain in the States of the Union, excluding the Territories, a population of only twenty to the square mile. If our population were of the same density as Great Britain it would amount to over two thousand millions.

"And there is no reason in nature why the same results will not follow the application of the same laws. Let one example show the results of English policy:

Great Britain took from the United States in 1876 8,328,000 hundred-weight f raw cotton out of a total import of 13,284,000 hundred-weight. For the whole of this cotton she paid £40,181,000, and of it she retained about five-sixths for her own consumption and exported to the rest of the world manufactures of cotton to the value of £67,641,268. In other words, after supplying her own wants, she drew from the rest of the world £27,500,000 more than the entire cost of the raw material. Of course she had to buy the food required to feed the labor employed in the production of these cotton goods, amounting to 479,515 persons. Her total imports of food amounted to £83,589,000, which enabled her to maintain a population of 33,000,000 of people upon an area not capable itself of supporting more than 10,000,000 of people.

"What a contrast does this present to our condition! With a surplus of food, with a surplus of raw material, we have somewhere from 500,000 to 1,000,000 of able-bodied persons who seek employment in vain. We are of the same race, and possess as much physical vigor and certainly equal intelligence with the English operatives. It is an admitted fact that a day's labor produces a larger result, on an average, in this country than in England. * * * *

"Raw materials, then, we have. Capital we can have on the simple condition of stern, unbending honesty. What else do we need so as to carry no dead weight into the race? We must have the kind of money which the world uses in making its exchanges. Money is merely a tool of commerce. A workman with bad tools cannot compete with a workman of equal skill who has good tools. Commerce is only a barter of commodities; but in order that this barter may go on without friction the mode of estimating values must not only be simple but sure and permanent, because time is required for reaching the markets where the bartered goods are to be sold.

"Gold and silver are the most unchangeable values, and hence have been made the standards of value throughout the commercial world. Of late, silver has been subject to violent perturbations, and hence countries using the gold standard have had great advantages in the operations of commerce. They buy more cheaply and make closer estimates of results. Hence, to-day goods cannot be bought in South America or the Asiatic markets except for bills payable in London. No matter what kind of currency may be used for local purposes, all foreign commerce reduces itself to gold values, and countries using a currency not convertible into gold are subjected to deductions, commissions and allowances due to the uncertainties caused by these fluctuations.

"Therefore, gold being the best tool or instrument of exchange, whatever nation will enter the list for the control of the commerce of the world must adopt a gold standard as the basis of its money system. Hence Germany, intending to enroll herself among the great commercial nations, has adopted the gold standard as the preliminary step to the absorption of Belgium and Holland, which will give her coal and colonies.

"So long as silver can be converted into gold at a fixed ratio it is equally available, except for its bulk, and it may possibly be restored to its old place by general agreement among the great commercial nations. But as the case now stands it is simply to retire from the race, if it is to be undertaken upon the basis of currency which is unstable, fluctuating and not in any respect as good as the best in use among our competitors. In other words, I do not hesitate to lay it down as a fundamental principle that it is not possible to get the control of the foreign commerce of the world except upon the condition of a single gold standard of value.

"By refusing to resume specie payments on a gold basis, and by offering to pay national obligations in silver, we simply postpone the day when we can enter successfully upon the struggle with England for the commercial supremacy of the world.

"But besides money and capital and raw materials, our commercial relations with the rest of the world must be of the most liberal and perfect character; we must not put any impediment in the way of getting such raw materials as we may lack at the lowest possible cost; we must take off duties which increase the cost of raw materials; we must lower taxes which add to the expense of transportation; and while we must at the outset protect our market as far as possible from the influx of foreign manufactures when they are sacrificed below cost in order to get rid of a surplus, we must do nothing to add to the normal and regular cost of his supplies to the consumer: *Sic itur ad astra.*" * * *

The views here set forth, so far as they concern the question of tariff, ought to satisfy reasonable protectionists—that is, all who do not regard protection as prohibition. On each individual industry which seeks protection, the inquiries will arise, What are raw materials? and what rate of duty will best promote the interests of trade and general prosperity, while securing the needed revenue to the government? These questions are not easy to answer. Certainly they are not to be answered by vague talk, either for protection or free trade.

With regard to the tariff proposed by the present House Committee, we have no sweeping judgment to pronounce one way or the other. In general, we are in favor of low duties, or none at all, on raw material. But we are quite aware that this is a vague term and leaves much to the discretion of the statesman in each case. It may be that Mr. WOOD'S committee has made a host of mistakes. The manner in which its work has been done without open hearing of the representatives of different industries, certainly would not insure a perfect result. But, on the other hand, the frank publication of the scheme, in advance of its introduction into Congress, atones for the privacy of its preparation, and the industries concerned are now being heard from with a vengeance.

As to the duties proposed upon articles within our professional sphere, we think that the reduction on pig-iron will not hurt the manufacturer, but will unnecessarily injure the revenue, without benefiting any trade to an equivalent extent. The increased duty on ores seems to us to be clearly an instance of mistaken taxation on raw materials. Strange to say, it was, as we are informed, the earnest appeal of Pennsylvania pig-iron manufacturers which secured this exclusion of cheap raw material for their own business! The high cost of ore is the greatest burden now resting on the blast furnaces of the Eastern States. Why should not Canada, Spain and Algiers be allowed to relieve an industry so overweighted, if they can? To the Eastern manufacturers of Bessemer steel, we take leave to say that the acquisition of cheap, pure foreign ores is of more importance than the small reduction proposed in the tariff on rails. From the standpoint of national economy, it is clearly advantageous to utilize the mineral resources of other nations while we husband our own. The cost of ore now contributes about one-third to the cost of iron. The average royalty on ore makes about 5 per cent. of the cost of iron. A saving in these items would directly assist the blast furnaces and rolling mills of the East in maintaining that competition with the West and the South, in which no tariff is of any avail. That Pennsylvania, whose only salvation will be hereafter the command of foreign markets, should ask for a higher duty on raw materials, is amazing or amusing, according to the mood in which one contemplates the phenomenon.

But we cannot pursue this digression further. We hope our readers will obtain Mr. HEWITT'S speech (as they can doubtless do by writing to him at Washington), and read it carefully. *

LOOKING FOR "FIGS FROM THISTLES."

The Philadelphia *Ledger* of the 11th inst. says:

"The stocks and other securities of the several coal-carrying companies hang rather heavy on the market, awaiting the activity that seems necessary to give an improved market value. As compared with prices about the 1st of January, Reading Railroad shares have declined from 17 to 13, Lehigh Navigation from 18¾ to 16¾, and Lehigh Valley from 40½ to 38½. Pennsylvania Railroad, also a coal carrier, shows a decline in the same time from 33¼ to 27¼. Increased prices of all these stocks are confidently expected with increased business of the companies."

Exactly so; but since the objects of the coal combination are to restrict production and to increase prices, which will necessarily *diminish business*, we cannot see much ground for the "confidently expected" improvement in these stocks.

"DR. HENRY MORTON AS AN EXPERT ON WATER-GAS."

Lest my silence should be misconstrued, I will occupy a very small space with a few words in reference to Mr. DWIGHT'S communication under the above title.

I have far too much on hand to spend my time in attempting to clear up, in Mr. DWIGHT'S mind, the darkness and confusion which there exists on the subject now under discussion; as regards others, my articles referred to, if read in full by any one familiar with the elements of the subject, will take care of themselves, and need no defense from me or any one else.

I would be ungrateful indeed, however, if I did not thank Mr. DWIGHT for the disinterested manner in which he has supported my results on the high percentage of carbonic oxide in water-gas by the publication of Prof. WURTZ'S report of last November. For this I am the more grateful because, to take this step, Mr. DWIGHT has been obliged to sacrifice his character for candor, since he thus makes it appear that at the very time he was quoting Prof. ROGERS' report, to prove that the Manayunk gas only contained 3·43 per cent. of carbonic oxide, he was suppressing Prof. WURTZ'S report, which showed that it contained 20 per cent.

Yours, etc. HENRY MORTON.

PETROLEUM RESERVOIRS AT THE DOCKS OF ST. OUEN, NEAR PARIS.*

By MM. Seraphin.

The greater part of the petroleum and mineral oils intended for the consumption of Paris is stored in the docks of St. Ouen, where floating reservoirs, each of the approximate capacity of 100 barrels (*cuves*) have long been in existence. The constant increase in the consumption made it necessary to enlarge the storage room, and fourteen fixed reservoirs have recently been added, of a total capacity of about 900,000 gallons. They are of sheet iron, 28 ft. in diameter by about 17 ft. in height to the spring of the arched cover; the thickness of the bottom and of the lowest ring of plates is ¼ in., and of the top rising $\frac{3}{16}$ in., while the thickness of the cover is only $\frac{1}{16}$ in. They are filled through openings at the top, 3 ft. 3 in. in diameter, and being all in one line, are connected by a bridge, or footway, which extends from one extremity to the other, a distance of 420 ft. They rest upon a platform of wood laid upon a rubble foundation. The petroleum, when brought on shore from the vessels in the river, is at first deposited in the floating reservoirs, which are partly submerged; from these it is pumped into the newly-constructed reservoirs, and thence drawn off through pipes into barrels. The total weight of the fourteen wrought-iron reservoirs is 151 tons; their cost was £3,080, or at the rate of £220 each.

WAGES TO BE STILL FURTHER REDUCED IN ENGLAND.—LONDON, March 12, 1878.—The Coal Owners' Association of North Yorkshire and South Derbyshire have determined to reduce miners' wages 7½ per cent. The men would probably consent to a reduction of 5 per cent., but it is thought likely that they will resist a decrease of 7½ per cent. This resolution of the Coal Owners' Association affects from 25,000 to 30,000 miners. Manufacturers in the North of England iron trade also propose to reduce the wages of their workpeople from 10 to 17 per cent. From the preparations the men are making it is believed that they intend to organize general resistance.

COAL MINES IN FORMOSA.—The China *Mail* hears from Formosa that the coal mines there are a great success. There are hundreds of tons of the black diamonds now lying about the place, and the miners appear to have got the coal so fast that the arrangements for its transport and sale have got rather behindhand. The workers are now what is termed "winning out the seam;" it will take six months before the works are in proper working condition. Between 200 and 300 tons, however, are being turned out per week, and the coal itself has only been worked about six weeks. It was expected that the screens would shortly be in place, while the railway from the mines to the sea-side was in working order down to the coal-staiths, though the coal-staiths themselves were not quite complete.

JORDAN'S PATENT HAND-POWER ROCK-DRILL.—A successful trial of the above machine was held on the 5th ult., at the quarry of Messrs. Cann Brothers, of Frighouse, Yorkshire, where the machine was at work during the day. Several holes of various depths were drilled in the bottom and ledges of the quarry at rates varying from 2 to 3 in. per minute. The simplicity and effectiveness of this little machine were much commented upon, and the rapidity with which two men can put down holes in the hardest rocks created much surprise. The drills used were 1¾ in. in diameter, and shaped like the letter S, though a chisel or cross-shaped point has been found to give equally good results in other cases. We are informed by the manager of the quarry, that the average depth drilled by handwork is 12, or, at most, 15 in. per hour, showing a very marked saving by the adoption of Jordan's drill.

* Abstract of a paper in the *Nouvelles Annales de la Construction*, 3d series, vol. 2, p. 83, from the Minutes and Proceedings of the Institution of Civil Engineers, of London, edited by James Forrest, Secretary.

REFINING COPPER BY ELECTROLYSIS—ECONOMY OF THE OPERATION AND PURITY OF THE RESULTING FINE COPPER.

By N. S. Keith, New York City.

Prefacing with the statement that impure copper, such as is known as blue, white, black, rose, regulus, mat, etc., can be more economically and effectually purified by electrolysis than by any hitherto practiced mode, and that it is, at the same time, the best mode of separating gold and silver from such material, I shall proceed to give my reasons therefor, and try, at the same time, to illustrate the theory by the statement of known facts.

We have at our command *Electricity*, a mode of motion which is a manifestation of *Force* on suitably assembled and arranged *Matter*. Other manifestations of Force are recognized, and have been named Power, Magnetism, Heat, Light, Gravity, Chemical Affinity, Adhesion, Cohesion, etc. That these are interconvertible is true. Thus, by Chemical Affinity, as is shown in a galvanic cell, we get Electricity, or Heat, or Light, or determine other Chemical Affinity or Magnetism, etc., according to the particular assemblage and arrangement of matter connected therewith. We are not yet able to arrange matter so that we may produce one of these effects to the exclusion of all others; and probably we never can. But we can use any one for the production of the others, interchangably. By the application of Heat to a thermo-electric pile we get Electricity, and by the Electricity, Magnetism in iron, etc. By Power, applied to a dynamo-electric machine, we get Electricity, Magnetism and Heat in the machine, and, when connected with suitable conductors and apparatus, Light from an electric lamp, Magnetism in an electro-magnet, determination of Chemical Affinity by causing formation of salts and deposition of metal in an electrolyzing cell, Adhesion of iron to the magnetic core, Cohesion of the molecules of the deposited metal, and the overcoming of gravity by magnetic suspension. All this within a single electric circuit, at one time. It is the aim of the electrician to so arrange the materials under his management that he may secure the greatest measure of the particular kind of action which he produces by the agency of electricity, as all the others are to him, at the time, useless. They all act as resistances to each other, and each absorbs its proportion of the force moving the matter composing the circuit.

It is the theory of the correlation of the forces and its outgrowth—the theory of the existence of one force with varied manifestations, which have led to the great strides which electrical science and art have made within the past few years.

Electrical science is valuable in so far that it gives us knowledge of an agent at our command by which we can convert one mode of force to another, or transmit it to a distance unchanged, or changed to another if we desire. The economy of the art consists in taking a cheap mode of force and converting it to a mode which we desire, and which is otherwise more costly to produce. Thus, we may apply power to a Gramme dynamo-electric machine, and by the generated current of electricity get an electric light, or effect the electrolysis of zinc, cheaper by far than by effecting the same by chemical action. Or, we may use the current from the machine to give motion to an electro-motor at a distance. Though we may generate a current of electricity by means of zinc and acid, and thereby produce light and power from an electro-motor, the results are obtained in that way at a far greater cost.

In an article written by me, and published in the ENGINEERING AND MINING JOURNAL, July 7, 1877, entitled "Can we transmit power in large amount by electricity," after theorizing upon the subject, I made this statement: "I have no doubt that at least fifty per cent. of the energy expended on a magneto-electric or dynamo-electric machine at a waterfall may be used at a distance by an electro-magnetic motor as mechanical power." The statement was by typographical error printed "2 per cent.," but was corrected in the next number of the JOURNAL.

It seems that practical experiments have since been tried in that direction. Dr. C. W. SIEMENS, in his Presidential address, delivered at the Annual Meeting of the Society of Telegraph Engineers, January 23, 1878, said: "Experiments have since been made with a view to ascertain the percentage of power that may thus be utilized at a distance, and the results of these experiments are decidedly favorable for such an application of the electrical conductor. A small machine, weighing 3 cwt., and entirely self contained, was found to exert 2·3 horse power, as measured by Prony's brake, with an expenditure of 5 horse power at the other end of the electric conductor, thus proving that above 40 (46 in fact) per cent. of the power expended at the distant place may be recovered; the 60 (54 in fact) per cent. lost in transmission includes the friction of both of the dynamo-electric and electromotive engines, the resistance of the conductor and the loss of power sustained in effecting the double conversion."

This digression is for two purposes: One, to illustrate the truth of the recognized laws and data of the science of electricity, for we make true deductions from true premises. The other to show a little pardonable pride. *Apropos* to the subject in hand, Dr. SIEMENS, in the same address, said: "The dynamo-electric machine has also been applied with considerable success to metallurgical processes, such as the precipitation of copper in what is termed the wet process of smelting. The effect of 1 horse power expended in driving a dynamo-electric machine of suitable construction is to precipitate 1,120 lb. of copper per twenty-four hours, equivalent to an expenditure of 72 lb. of coal, taking a consumption of 3 lb. of coal per horse power per hour."

This seems at first to the copper smelter rather startling. However, I believe that the amount of copper per horse power can be much increased above that.

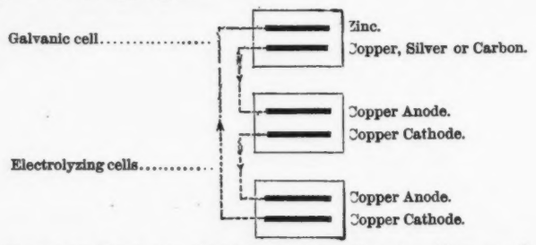
In endeavoring to make the case and this last proposition clear, I shall commence with a few fundamental experiments, explaining as we go along.

Take a SMEE galvanic cell, having ·5 volt electromotive force, ·5 ohm resistance, and electrically connect it with a copper electrolyzing cell having a resistance of ·5 ohm. The result will be a current of ·5 veber. One veber current causes the solution of 18·0 grs. of copper from the anode and the deposition of the same amount of copper per hour upon the cathode of an electrolyzing cell. An equivalent quantity, 18·46 grs. of zinc, is dissolved in the SMEE cell. So the amount of copper deposited by this arrangement is 9·0 grs. per hour. Next take a DANIELL galvanic cell, having an electromotive force of 1 volt, resistance of ·5 ohm, and connect it with the same electrolyzing cell. The current will be 1 veber. The amount of copper deposited by this arrangement is 18·0 grs. per hour, and 18·46 grs. of zinc are dissolved in the DANIELL cell. Next take a BUNSEN cell, having, say, 2 volts electromotive force and a resistance of ·5 ohm. Connect it with the electrolyzing cell and we have a current of 2 vebers. The copper deposited now is 36 grs. per hour, and 36·92 grs. of zinc are dissolved.

In these three cases we observe that increased electromotive force increases the speed of the deposition, *i. e.* more copper is deposited per hour. We also observe that the relative quantity of zinc dissolved remains the same in the three cases, *i. e.*, an equivalent of zinc for an equivalent of copper.

We cannot well change the electromotive forces of these cells, but we can their resistances, by making them larger for less resistance, and smaller for more resistance. We can in the same way change resistance of electrolyzing cells. For less resistance make the anode and cathode larger.

Having made two electrolyzing cells, each twice as large as the one we have been using, they have each then a resistance of ·25 ohm. Connect in succession the several galvanic cells with the electrolyzing cells, as by the following diagram:



The arrows show the direction of the current. Now we find that the electromotive forces are the same, the resistances the same, and the current the same, and also we have the same amount deposited of copper in *each* electrolyzing cell, or twice as much, aggregated, as before, with no more zinc consumed. So we do with three, four, ten or more electrolyzing cells, increasing their size, three, four, ten times, as the case may be, so as to preserve the same resistance, and we find three, four, ten, etc., times as much copper deposited, with no increase in consumption of zinc.

(TO BE CONTINUED.)

METALLURGY OF THE VIRGINIA GOLD ORES.

By J. H. Morton, M. E.

In a former letter to the ENGINEERING AND MINING JOURNAL, I gave a description of the gold-bearing veins of the Virginia gold belt, in which I stated something of their extent and the nature of the veins. Since that time I have extended my observations further, and have become convinced that they are of even greater value and extent than I then stated or supposed. Many of the veins are of great extent, and are from six to thirty feet in thickness, and carry from six to over eighty dollars per ton in gold. There are, generally speaking, two classes of veins; first, veins in the slate, striking generally N. E. and S. W., and, second, veins in the syenite, striking S. E. and N. W., approximately, the larger veins occurring in the syenite. The characters of the veins differ in this, that in the syenite they are more persistent in length, and dip at a nearly vertical angle, while in the slate they are more irregular in length, and dip at various angles, from 25° to 80° from the horizon. The characters of the ores also differ, inasmuch as that in the slate the quartz is more laminated than in the syenite, and the quantity of free gold is greater than in ores of equal assay value from the syenite. However, this difference is not of so much importance, as in all the veins the quantity of gold that can be amalgamated in the ordinary mill process is only from five to twenty per cent. of the gold contained in the ore. Thus, while ores contain, by assay, from $25 to $75 per ton, the mill will usually return from $4 to $12, or even less, and as concentrating seems to be the only resource thought of to save the gold, I determined so try this process. Accordingly, I shipped a quantity of mixed ore—sulphuret and quartz—to New York for treatment, the assay value of which was $20.85 per ton, from which I obtained ¾ concentrating stuff, *i. e.*, stuff passing through less than 90-mesh screen and ¼ of slimes, or stuff passing 90 mesh. The result, by assay, was: Slimes, $28.47; concentrations, $207.50; tailings, $3.45 per ton, giving a concentration of 20 tons and 104 lb. into one. The loss being, in tailing, 17½ per cent., and in slime, which could not be concentrated (dry), 31 per cent., or a total loss of 48½ per cent. of the gold in the ore. On the remaining 51½ per cent. there would be a loss of 25 per cent., the market price being 75 per cent. of the gold value of such ores. Thus, the coin value of such ores would be, after treatment, $5.87 per ton on the gross quantity of ore, or about 21 per cent. of the gold contents of the original ore. This would not do for practical working, and still it is much better than the mill returns upon the same quality of ore. My attention was next directed to "wet concentration," but that proved even worse than the dry, for the particles of gold being so extremely fine, they would float above the grains of sulphuret and oxide of iron, and pass off with the sand, leaving the iron with whatever gold it contained in the bottom of the vessel, the free gold being completely lost. In this way ores containing over $75 per ton, by assay, would show nothing in the pan, and often the thin flakes of gold would float around in the pan above the iron. I soon learned the cause of this by examining the ore with a strong glass. The gold is seen to be in the form of extremely thin flakes, even when they are of apparently considerable size; they will be found to be merely leaf gold, and so thin as to float as readily as pieces of ordinary gold leaf. Here, then, is the difficulty a two-fold one—first, the gold is associated with a substance of practically equal gravity, and therefore cannot be economically concentrated; and secondly, it is bedded in a matrix that prevents profitable raw amalgamation, because, to amalgamate at all, the gold must be freed from the inclosing pyrites, and must have every facil-

ity for mingling with the mercury, but if the gold is, by its natural fineness or form unable to sink through the mass of iron and sand present with it in the battery and reach the mercury then it cannot be amalgamated and must pass off with the lighter materials. This is the mechanical difficulty; the chemical difficulty is in keeping the mercury in condition to attach itself instantly to the gold when it is brought into contact with it, and this is even a more serious difficulty than the other, for if the only difficulty was to bring the gold and mercury together then the revolving barrel would present a means, sure and cheap, of doing so. But the difficulty is that the mercury used in a revolving barrel with sulphureted ore will not amalgamate the gold, nor will its particles entirely unite with each other, but become floured or dispersed in separate atoms that appear to have a repelling force upon each other and float off readily with the sands from the settling apparatus, carrying, of course, any fine particles of gold they may inclose with them. The cause of this, so far as I have been able to investigate the subject, is the action of the sulphuric acid upon mercury. When the sulphides are for any time exposed, decomposition sets in, forming soluble sulphates, which dissolve readily in the heater of the battery or amalgamating apparatus, forming a weak sulphuric acid solution, which, reacting upon the mercury, causes each particle to become coated with a thin, almost imperceptible, film of sulphide of mercury and locks up the mercury as effectually as if it were inclosed in a gelatine capsule. Mill men in the West recognize this fact, and hence the use of cyanide of potassium in the silver mills throughout the West. But this cannot or has not been done in the gold mills, for the reason that to heat the constant stream of water passing through a gold mill would be too expensive a process for use, but it might be tried in the barrel process with gold ores. Some alkali is certainly needed to counteract the effect of the acids derived from the pyrites, and some process is needed that will bring every particle of gold into contact with the mercury. There is in this a double difficulty—first, to bring such microscopic particles of gold into contact with the mercury; and, secondly, to keep the mercury in such a condition as to enable it to readily amalgamate the gold. This can be done in one way that I have tested—by roasting the ore thoroughly and eliminating the sulphur completely, and then amalgamating the ore something as is done in PAUL'S dry amalgamating process, which is in use in some parts of the West. This appears to me to be the most thorough, as well as the cheapest method of working the Virginia ores. If it succeeds on a large scale, the future of the Southern mines will be assuredly better, for it is a notorious fact that not over 10 per cent. of the gold in the ores worked has yet been obtained.

[Has our correspondent ever tried WURTZ'S sodium amalgam.—ED. E. & M. J.]

THE HOCKING VALLEY (OHIO) IRON DISTRICT.

[From the American Manufacturer.]

The following discriminating observations on the present and prospective outlook for this new iron region are from an editorial by Mr. WM. KENT in the *American Manufacturer* of the 1st inst. We make only brief extracts:

The following is a list of the furnaces in the new district:

Name of Furnace.	Location.	Size.
Moxahala	Moxahala, Perry Co	50×14
Baird	Near Shawnee, Perry Co	41×11½
Fannie No. 1	Shawnee, Perry Co	48×12
Fannie No. 2	Shawnee, Perry Co	48×13½
XX	Shawnee, Perry Co	50×14
Vilas	Shawnee, Perry Co	50×14½
Bessie	New Straitsville, Perry Co	50×14
Gore	Gore, Hocking Co	48×12½
Winona	Winona, Hocking Co	50×12½
Crafts	Monday Creek, Hocking Co	54×15
Monday Creek	Monday Creek, Hocking Co	52×14
Ogden	Orbiston, Hocking Co	50×15
Akron	Bessemer, Athens Co	50×16

The advantages of the district may be briefly summed up as follows: The presence of coal, ore and limestone in immediate proximity; the great quantities of each, and the facilities for procuring them cheaply. There are two principal veins of coal, one the Nelsonville or Great Seam, varying from 6 to 12 feet thick, persistent throughout the whole region, and as easily and cheaply mined as any seam in the country. This coal is used exclusively in the furnace. The other seam, known as the Bayley's run seam, nearly, if not quite continuous through the whole region, 3 to 4½ feet thick, has not, as yet, been mined to any extent. There are three principal veins of ore, which form the reliance of the furnaces, the Shawnee ore, the Baird or Limestone ore, and the Bessemer or Buchtel ore. These very in thickness and in quality, and in many places only one of the three is obtainable. The Baird vein lies beneath the great seam of coal, the others above it. Besides these veins there are a number of others, chiefly above the great vein, and generally found in the southern part of the district, but their extent and quality have not yet been determined. Limestone is found in several seams from 2 to 4 feet thick in all parts of the district, and is abundant in quantity, but not valuable in quality.

Of the quality of the ore we may say that in general it is very silicious and cold short, and suitable for making only foundry iron or an iron which can be used for mill purposes only in small percentage, as a mixture with other irons. The foundry iron is well spoken of by stove manufacturers and makers of light castings in Columbus and Chicago, where it has so far met a ready market. The ore, however, is not uniform. We have seen analyses which give the metallic iron from 9 to 60 per cent., the silica from 5 to 56 per cent., the lime from 0·5 to 32 per cent., and the phosphorus from traces to 1·15 per cent. Of course the worst of these analyses do not represent iron ores at all, but ferruginous sandstones and limestones; nevertheless they were mined and analyzed as ores, and it would require an expert of a much higher degree of intelligence than an ordinary furnace founder to separate them by their appearance. The following analysis of the the Baird ore, calcined, made from a properly selected average "furnace sample," was given us at the Thomas Furnace. It was made by Prof. WORMLEY, formerly of Columbus:

Sesquioxide of iron	66·86	Phosphoric acid	0·735
Silica	21·64	Sulphur	·29
Oxide of manganese	1·10	Water combined	4·05
Alumina	2·35		99·845
Carbonate of lime	1·75		
Carbonate of magnesia	1·07	Metallic iron	46·80

Other analyses of this ore by Prof. WORMLEY gave 42·70 and 42·80 per cent. of metallic iron.

From the analyses of the ores given above, some conception may be had of the difficulty of successfully managing a furnace in this region. The quality of the ores in universally silicious, and they vary widely in different sections, the same vein containing very much more silica at one place than another. Besides, the ore being chiefly a blue or gray carbonate, more or less converted according to the depth of cover into limonite, the appearance of the ore is very deceptive, and the most experienced men will often fail to judge the percentage of iron by the eye within 20 per cent. The coal is usually more reliable, and the limestone is generally less variable than the ore.

It is perfectly amazing that capitalists of ordinary business judgment should have been so rash as to build furnaces in this district without thoroughly investigating the character of the ores in the vicinity of their location, yet such has been the case. Some of them may fortunately have hit upon a good location, more by chance than good judgment, but it is almost certain that others have made a great mistake, and will be enabled to make iron out of their ores only by mixture of richer ores from other regions or by an enormous expenditure of fuel. While the Shawnee furnaces claim to have made iron with less than three tons of coal, two tons of ore and three-quarters of a ton of limestone per ton of iron, we are credibly informed that some of the other furnaces have been compelled to use more than four tons of coal, four tons of ore and one ton of limestone, or more than nine tons of material per ton of pig iron. One of the furnaces has been compelled to abandon the use of the fuel adjoining its location, on account of sulphur, and to transport coal by rail from another section, and nearly all of the furnaces are using some Lake Superior ores as a mixture.

Nearly all the furnaces in the region have suffered from bad management. The founders in charge are the so-called practical men, who generally do the fluxing and driving of the furnace by guess-work.

In regard to the present cost of making pig-iron in the Hocking Valley district, a partner in one of the furnaces gave us some figures which we consider reliable, as they correspond closely with what we have learned from a number of other parties during the past year. Here are the figures: The average cost of pig-iron at a well-managed furnace is from $14 to $15. The average cost in the coming year will vary from $12.50 to $18, according to the location, the quality of ores used and of iron made, and the management.

Ore costs $1.75 to $2 per ton on the calcining kilns, including 40 cents per ton royalty. The Baird ore will cost $2.25, as it is a thin vein. Limestone costs from 90 cents to $1.40 per ton at the furnace. Coal costs about 70 cents per ton on board cars at the mines, including all expenses. It will cost the furnace from 70 to 85 cents. The quantities used per ton of iron will vary according to the quality of each material. Raw ore, from 3 to 4 tons; coal, from 2½ to 4 tons; limestone, ¾ to 1 ton, making two estimates from the extremes of these figures, as follows:

FIRST ESTIMATE.		SECOND ESTIMATE.	
Ore—3 tons at $1.75	$5.25	4 tons at $2.00	$8.00
Coal—2½ tons at 70c	1.75	4 tons at 85c	3.40
Limestone—¾ ton at 95c	68	1 ton at	1.40
Material	$7.68		$12.80
Labor and incidentals	3.00		5.00
	$10.68		$17.80

The first estimate is hardly a probable one, as it is not likely that any one of the furnaces has a combination of *all* the most favorable advantages. The second is probably too high for the similar reason, viz., that no one furnace is likely to have a combination of all the disadvantages, but this is by no means certain.

Another gentleman gave us what he considered a rather high estimate of cost at his furnace, as follows:

Raw ore—3 tons at $2.25	$6.75	Coal—3 tons at 90c	$2.70
Limestone—1 ton	1.00		
Materials			$10.45
Labor and incidentals, supposing furnace works regularly			3.00
Extra to cover expenses of blowing out, etc			2.00
			$15.45

To sum up, our judgment concerning the whole region is that it still offers inducements for capitalists, not to enter and blindly erect a furnace on the first spot that is shown them by landowners, but to carefully investigate the advantages of every section, and to invest their money in a furnace only after they have invested something in developing the ore land and having the ore thoroughly tested by analysis. We believe that there are furnace locations to be had in the district superior to any that have yet been built upon, and that furnaces will yet be built there which will make iron cheaper than any of those now in existence. A great part of the region is yet undeveloped, and its capacity for making iron is unknown, but the indications of cuttings into the outcrops are very favorable.

Finally, we have a word to say concerning the coal of the Bayley's run seam. This has been coked in an experimental way at XX Furnace, and the coke is said by several disinterested parties to be fully equal to Connellsville for a blast-furnace coke, in ability to bear the burden, and superior to it in small percentage of ash. We are not informed as to the cost of mining this coal, but as it exists in a 4-foot seam, generally above water level, and with a good roof, it can probably be mined and coked very cheaply. If so, and if it is a fact that it is a good blast-furnace coke, it would probably be more profitable to use it in place of the dry-burning coal of the great seam. It would require not more than half as much coke to make a ton of iron as is required of raw coal; the furnace using it would turn out a much larger product and work more regularly. It is surprising that this coke has not been tried on a large scale, and that men can be found who will venture a hundred thousand dollars in a blast furnace to make iron out of ores which may prove to be sandstone, and will not venture a few hundred dollars in experimenting on a coke which offers such promising result. We look upon the subject as the most important problem before the district. It may not make a good furnace coke on the large scale, but if it does, and can be mined cheaply, and if lake ores can be freighted as cheaply to that district as to Pittsburg, as we believe they can, the Hocking Valley has a greater future before it as an iron centre than most of our manufacturers imagine.

A HISTORY OF TUNNELING.

Continued from page 185.

[Extracts from advance proofs of *A Treatise on Tunneling, Explosive Compounds and Rock Drills*, by Henry S. Drinker, Mining and Civil Engineer. Published by John Wiley & Sons, New York. (Copyrighted.)]

In 1832, Braconnet dissolved starch in nitric acid, obtaining a white, combustible substance he called xyloidine. In 1838, Pelouze showed the action of nitric acid on wood fibre (see *London Chemical News*, No 234, "On the Chemical History and Application of Gun-Cotton"), and, in 1846, Schönbein, with his discovery of gun-cotton, foreshadowed the revolution that has come in mining and tunneling. Sobrero followed him in 1847 with nitro-glycerine. Gun-cotton was shown by Schönbein at the British Association, September 1, 1846. His discovery immediately led to many other similar compounds being made. A description of nitro-sugar was published by Lewis Thompson, December 8, 1846 (*Pharmaceutical Transactions*, 1846-'47, vol. vi., p. 349). In the *Comptes Rendus de l'Académie des Sciences*, vol. xxiv., Session of January 25, 1847, there is a communication from M. Pelouze, through Messrs. Florés, Demonte, and Ménard, announcing that mannite and the various species of sugar and gum furnish compounds analogous to pyroxyline, by the action of nitric acid. Sobrero, in a subsequent letter to Pelouze, noticing the above communication, claimed that the idea of producing fulminates from sugar and analogous compounds had been realized "long since" by himself—*i. e.*, prior to Pelouze's experiments. In the same letter Sobrero announces his discovery of nitro-glycerine.

Owing, however, to the early fear that was manifested in their application, these explosives did not come into general use until 1860. In 1862, gun-cotton was again tried in England, and, in 1863, Nobel, of Hamburg, began to bring nitro-glycerine into general use as a blasting agent. In 1867, he applied it in the form of dynamite, by mixing it with silicious earth; since that time the use of nitro-glycerine has become general throughout the world, it being used both in the pure, also as dynamite proper, and in a multitude of other forms which will be found described more particularly in Chapter III., where also will be found noted various other compounds suggested of late years as substitutes for gunpowder.

THE INTRODUCTION OF BLASTING INTO MINING.

So much for the history proper of the discovery and early knowledge of explosive compounds; we now come to the history of their early practical application.

The first decisive note on the use of gunpowder for blasting is placed (according to Meyer) in the year 1397, at Merat, where a mine was blown up in military operations. Later are noted the mines before Belgrade in 1141, and the ones tried by Knut Posson, commandant at Wiborg, in 1495. By many the introduction of powder-mines in military operations is attributed to the Genoese engineer, Francesco de Giorgio, from Siena, toward the close of the fifteenth century. The real introduction of mines in warfare on a large scale, however, is generally attributed to Pedro Navarro. who made his first attempt at Serezanalla. In 1500, he was more successful before St. Giorgio in Cefalonia. In 1503, mines were used in the siege of Neapolitan castles, and, in 1523, before Milan; and Hoyer expressly states that, as the art was not well known, they met with ill success at Milan, and that therefore, at Verona and at St. Paul, they returned to the old method of undermining and heating the rock to crack and shake it.

Meantime the Turks were more skillful, using powder-mines with great success at Rhodes in 1523 and before Vienna in 1529; and during the crusades, miners are said to have accompanied the troops.

Later, Mathesius writes in his *Bergpostill*, p. 23: "The great generals always liked to carry miners with them. . . . . Thus, in the siege of Vienna, miners are said to have driven against the Turkish sappers, and to have met them and captured from them some casks of powder. In order to find out where the Turks were with their gallery, they are said to have placed a drum upon the earth, and at night, when it reverberated, they knew where to sink down."

Honeman, p. 136, also says that Tilly had 300 miners brought from the Harz during the siege of Göttingen, and employed them in mining.

In his *Geschichte der Kriegskunst*, Hoyer (I., p. 525) distinctly mentions that, at the time of the Thirty Years' War, companies of sappers and miners existed in the various armies, the Swedes only excepted, whose Dalekarliers were, to a man, miners, and who therefore needed no special companies. The same author mentions in vol. ii., p. 129, that the Turks also had especial miners at the siege of Vienna, whom they called Lagumgys, chosen from Armenians, Greeks and Bosnians, accustomed to work in a mine.

The oldest positive records on blasting and drilling date from 1613, with the distinct mention of its use in the mine.

Gätchman cites an account of ore raised in the quarter Trinitas, Anno 1715, where, on the occasion of the death of a boss killed by a shot in the Altväter Fundgrube, the following note was made:

"Drilling and blasting was invented in 1613, by Martin Weigel, chief mining boss at Freiberg; at first wooden plugs were used to tamp the holes, but for thirty years past (*i. e.*, since about 1685) this has been more safely and easily done with clay. Now, also, at various places, certain small hand-drills have been introduced, by which the miners can very advantageously gain upon hard rock."

Now, assuming that Martin Weigel made his first experiments in blasting in 1613, as we have seen that Berthold Schwartz's discovery dates from 1320, it would appear that some two hundred and ninety-three years elapsed, after its original discovery, before gunpowder was applied in mining, and some thirty years more passed after Weigel's application of it, before it was found in general use in the German mines. Even after its use had become generally known, it would appear that the progress toward the adoption of blasting, as the chief means of rock excavation, was exceedingly slow. In the year 1693, the total quantity of powder used in Germany is said to have only amounted to 19 cwt. In 1644, fifty-seven shots only were fired in the mine, Hohe Birke using 117 lb. of powder. In 1675, thirty-one years later, only 3 cwt. were used in this mine, while in the same year (1675) the consumption of powder in the whole Freiberg region had risen to but 100 cwt. In 1843, the consumption was 2,429¼ cwt.

Counting from 1613, it is said that fifty-seven years elapsed before blasting was taken to England by German miners; and one hundred and eleven years before it was taken by them to Sweden. For seventy-two years, bore-holes were stopped with a wooden plug before it was discovered that tamping with clay or any soft material sufficed. Eighty-three years passed by before narrow bore-holes were used; for one hundred and seven years, boring was done by several hammers on one drill, and for one hundred and twelve years blasting was only auxiliary work; cuts being made into the rock before the face was blasted out. Again, one hundred and thirty-four years elapsed before it was officially decreed in the Freiberg region that blasting should be used in hard rock instead of pick and gad work; one hundred and seventy-seven years are said to have passed before the advantage of leaving a hollow space was mooted; one hundred and seventy-eight years before the use of sand-tamping was found out; two hundred and eighteen years rolled by before Bickford, in England, invented the safety-fuse and it is notable (as we have before seen) that in the same year (1831) the first patent for the simultaneous blasting of a number of holes by electricity was taken out by Moses Shaw of New York. Further, two hundred and thirty-three to two hundred and thirty-four years elapsed before Schönbein and Sobrero inaugurated the era of high explosives by the discovery of gun-cotton and nitro-glycerine; two hundred and thirty-six years before Couch, of Philadelphia, made the first percussion rock-drill; and, finally, two hundred and forty-eight years after Weigel's day—*i. e.*, in 1861—machine rock-drilling was finally triumphantly established at Mont Cenis.

CHRONOLOGICAL TABLE.

The following are a few of the most important events concerning explosive compounds, drilling and blasting, recorded in Mr. Drinker's book. Our limited space prevents our giving more copious extracts:

A.D.
80. The Chinese are said to have known of powder prior to this date.
215. Julius Africanus is said to have described the preparation of powder.
811. Emperor Leo is said to have had fire-arms of some kind.
846. Marcus Gracchus (in a work preserved in the University at Oxford) records an explosive mixture of one pound of sulphur, two pounds of charcoal, and six pounds of saltpetre. (S. Jebb, London, 1733.)
1085. In a sea-fight near Toledo, "fiery thunder" was shot from the ships of the King of Tunis. (Peter Mexica, on authority of Bishop Peter of Leon.)
1130. At this time, rock is said to have been blasted with powder in the Rammelsberg, near Goslar (?). (This tradition is not well authenticated and is much questioned.)
1238. Don Jayme used "large fire-balls which burst" at the siege of Valencia.
1280. Albert Magnus, the German preaching friar, who was of the lineage of the Counts of Bällstadt of Laningen, described powder, and is said to have known of muskets. He died at this date.
1284. Roger Bacon (died 1284) speaks of the components of powder as already known (De Militate Magiæ).
1296. The miners in Devonshire were either too few in number or not sufficiently skillful, for, in this year, 337 miners were brought from the wapentake of the Peak, in Derbyshire, to Martinstowe, who fined and cast into bars 704 pounds weight of silver. In the next year, 348 miners, brought from the same place, 25 from wales, and others natives of the county, were employed, but the quantity of silver raised has not been stated in the accounts. In the next reign, silver continued to be brought to the king's moneyers from these mines. (Weale's *Quar. Papers on Engineering*, vol. v.) (No explosive used, of course.)
1303. A gun, with this year engraved upon it, is said to be in the arsenal of Amberg.
1308. The Spaniards used fire-arms.
1311. Brescia attacked by Henry VII. with blunderbusses.
1312. The Arabs had fire-arms at the siege of Baza.
1320. Berthold Schwartz is said to have invented gunpowder (the year varies, with different authorities, between 1320, 1354, and 1380).
1381. The citizens of Ghent used fire-arms against Bruges; also there was a bombard used, which threw stones, at the siege of Oudenarde, the report of which could be heard at night a distance of "ten hours' circuit" (about thirty to thirty-five English miles). Froissart says of the bombarb used at the siege of Oudenarde that it was fifty feet long, "and threw great heavy stones of wonderful bigness. It might be heard five leagues by day and ten at night, making so great a noise as if all the devils in hell were abroad."
1429. The first shooting at a target with fire-arms on record was held at Nuremberg (Memoirs of the City of Nuremberg.)
1439. Hand-guns or hand-cannon were used at the siege of Lucca. They were soon after introduced into England. They are thus described by Billius, a noble Milanese: "The Milanese, besides darts, and what projected arrows, invented a new kind of weapon; also in their hands they held a sort of club, about 1½ cubits long; to this was affixed iron tubes, which, being filled with sulphur and nitre, emitted iron balls. The blow, if it struck, was certain destruction: neither armor nor shield was sufficient protection, for often two or three deep if fired upon, would be transfixed by a single ball. For two hundred years after the invention of gunpowder, all fire-arms were called cannon." (Weale's *Quar. Papers on Engineering*, vol. v.)
1430. Henry VI., of England, having failed in his attempts to procure gold and silver by the art philosophical, brought over in 1430, Michael Gooselyn, George Harbryke, and Matthew Lameston, three famous miners, with thirty other miners in their company, from Bohemia and Hungary, to superintend and work the royal tin mines and instruct the Cornwall men in their art. (Weale's *Quar. Papers on Engineering*, vol. v.)
1523. At the siege of Milan, the mines sprung with bad success, so the besiegers returned to the old method of burning the supporting timbers.
1525. Powder first grained.
1561. Queen Elizabeth, by the advice of her council, this year brought several Germans into England, who were experienced in mining. (Weale's *Quar. Papers on Engineering*, vol. v.) (In 1564, the queen granted patents to two of these miners, Houghsetter, and Thurland, to search for mines, etc., in eight counties. In 1566, a second patent was granted to William Humphreys and Christopher Shute (a German), to dig and work all mines etc., in England, Wales and Ireland, not included in Houghsetter's patent.)
1613. Martin Weigel, mine superintendent of Freiberg, proposed drilling and blasting in mining.
1632. Drilling and blasting introduced into the Harz Mountains.
1640. General Leslie surprised the English army with his *tin* artillery, covered with leather. They would bear two or or three discharges. One Scott, a Scotchman, who had served under Gustavus Adolphus, was their inventor. (Weale's *Quar. Papers on Engineering*, vol. v.)
1669. Mayon published his chemical analysis of powder.
1670. Blasting introduced into England by German miners.
1673. It is said, that prior to this date, one-hand drilling had been introduced.

(TO BE CONTINUED.)

THE FIRE CLAYS AND ASSOCIATED PLASTIC CLAYS, KAOLINS, FELDSPARS AND FIRE SANDS OF NEW JERSEY

By Professor John Smock.

[A paper read before the American Institute of Mining Engineers, at Philadelphia, February 27, 1878.]

The fire clays of New Jersey belong in two geological ages—the cretaceous and quaternary, or post-tertiary.

Three very small deposits of plastic clays have been discovered within the limits of the Archaen rocks. These are not refractory, and of little importance, excepting in a geological consideration. They have resulted from the decomposition of the feldspars of the rock *in situ*, and they have been classified as inferior kaolins.

All of the fire clays, fire sands, and the so-called *kaolins** and *feldspars* are sedimentary formations. They have come from the decomposition of crystalline feldspatic rocks. The source of this vast amount of material was probably a continental area, or belt of land, southeast of our present Atlantic Coast Line. The isolated granitic outcrops of Jersey City, and on Staten Island, appear to belong to a submerged and covered archaen formation, which was once a continuous belt from New York to Trenton, and thence southwestward.

The several outcrops and localities where these strata of fire clays and other refractory materials occur, are grouped geographically in three districts of the State. The most important of these is in Middlesex County, East of New Brunswick, and extending to the Staten Island Sound and Raritan Bay. Its northern limit is a line parallel to the Pennsylvania Railroad, from New Brunswick to Rahway, and about two miles south of it. The Chesquake Creek forms the south boundary. This district has an area of 68 square miles. It has been very carefully surveyed and represented upon one of the maps† of the geological survey, on a scale of $\frac{1}{1}\frac{1}{1}\frac{1}{2}\frac{1}{0}$, or three inches to a mile. The well-known Woodbridge and Amboy clays, *kaolins* and fire sands come from this district.

The second district is geologically one with that above described. It is the extension of the latter across the State, and along the Delaware River, from Trenton and Bordenstown, southwest to Salem County, where it passes out of the State, and thence crosses the river and appears in Delaware. The Trenton, Florence, Peusauken Creek clays, etc., etc., are in it. The third district (or, more properly speaking, group) includes all the more recent clay deposits of that part of the State, which is south and southeast of the green-sand marl belt. The clays at Conrad, in Gloucester County, and those of Wheatland, and the Union Clay Works, in Ocean County, are the principal localities.

As above stated, the first or Middlesex County clay district is the most important, and it produces an aggregate many times larger than the sum total of all the rest of the State, as well as materials of superior quality and of more value. This district is bounded on the northwest by the Triassic shales and sandstones, and the beds of clay overlie these. The glauconitic, clayey marls bound this district on the southeast, and the strata of marl are seen upon the top of the clay series. Between these geological limits the following beds are recognized as distinct and marked by characteristic features. They are, beginning at the top:

	Feet.
Dark colored clay (with beds of lignite)..	5
Sandy clay (with sand in alternate layers)	40
Stoneware clay bed	30
Sand and sandy clay (with lignite near the bottom	50
South Amboy fire-clay bed	20
Sandy clay (generally red or yellow)	3
Sand and *Kaolin*	10
Feldspar bed	5
Micaceous sand bed	20
Laminated clay and sand	30
Pipe-clay (*top white-clay*)	10
Sandy clay, including leaf bed	55
Woodbridge fire-clay bed	20
Fire-sand bed	15
Raritan clay bed—Fire clay	15
Sandy clay	4
Potters' clay	20
	347

The dip of this clay formation corresponds in direction to that of the green-sand marl beds on the southeast. An interesting feature of this dip is the diminishing rate in going from the older to the newer or from the northwest to the southeast. Thus in the Raritan clay bed it is 60 feet per mile; in the Woodbridge and South Amboy fire-clay beds, 57—48 feet, and in the stone-marl clay bed only 30 feet, or the same as that of the marl beds above it.

As is well known, the Triassic slates dip toward the northwest and at much higher angle than that of these clay beds. The latter are seen lying uncomformably upon the former.

Nearly all of these strata, or members of this formation, contain materials of more or less value in the arts, and especially so in the manufacture of fire-bricks and furnace linings of all kinds, gas-house retorts, sewer and drain pipes, various ceramic products, and potters in general. While there is much variation in the character of the materials found in any one of these, there are general features which are characteristic, and enable the miner to recognize it and then decide its prospective value.

The early recognition of these distinguishing features is very important to the explorer and miner. Some of these, with descriptions of localities, are here given, following the order of the geological column or series as above, but beginning with the lowest number, the

RARITAN POTTERS' CLAY BED.

This bed reposes directly upon the red shale and sandstone of the Triassic age. It has been opened at comparatively few points, and at none of them has there been much work done in digging or mining the clay. Its more important localities are the pits in the vicinity of Piscataway and Bonhamtown. The clay of this bed lacks that degree of homogeneity so characteristic of the higher fire-clay beds. It is very frequently laminated in structure, and appears to be a mixture of materials from different sources and of somewhat unlike character. Much of it is, however, very white, almost free from gritty particles, and resembles some of the finest of the Woodbridge clays. But it does not *stand* in the fire, and cannot be considered a fire clay, although there are thin sections of it quite refractory. Its composition is shown in the following analysis:

	I.	II.		I.	II.
Silicic acid (combined)	45·61	38·20	Magnesia	....	0·21
Alumina and titanic acid	39·04	35·09	Ferric oxide	1·10	1·80
Water (combined)	10·91	12·10	Sand (quartz)	0·71	8·60
Potash	2·36	2·44		99·87	98·74
Soda	0·25	0·21			
Lime		Traces			

*These terms have been greatly perverted by local usage in New Jersey. By *kaolin* is understood a micaceous sand; by *feldspar* a mixture of round grains of quartz and sand and fire clay.

†See *Reports of the Clays of Woodbridge, etc., etc.*, Trenton, 1878.

Separated from this clay by a thin bed of lignitic sandy clay, there follows the Raritan fire-clay bed. This is marked by a drab color and more sandy texture. It has been recognized by its elevation and those marks in Dixon's pits at Woodbridge and in several small pits near Bonhamtown. The clay of this bed is more dense, and corresponds to some of the foreign glass-pot clays. It has been tried for crucibles for steel makers and for glass pots, but not so fully as to establish a character for it. It is a good clay for brick making. Analysis shows its composition to be as follows:

Silicic acid	31·32	Magnesia	0·08
Alumina	27·13	Ferric oxide	1·26
Water (combined)	9·63	Titanic acid	1·93
Potash	Traces	Sand (quartz)	29·00
Soda	Traces		
Lime	Traces	Total	100·35

Its specific gravity is 1·994—2·047. It will be observed that this is not fat or aluminous, as the Raritan potters'-clay bed clay. This bed seems to be destined to furnish much more clay than it now does, and probably for wider uses than some of the other clays of this district. It does not now appear in the market.

The next bed is a *fire-sand*, and consists almost exclusively of sharp, angular grains of white quartz sand. This is sometimes discolored by iron oxide stains, and occasionally it contains a small percentage of white clay and sandy earths. This bed yields nearly all the fire-sand which is dug in the district.

Going up in the series, the next, the *Woodbridge fire-clay bed*, is one of the most important of the whole. The fire-clays dug about Woodbridge and in the several banks along the north shore of the Raritan River come from this part of the clay formation. There are a great many separate pits, owned and worked by many individual proprietors and clay diggers.

This bed is generally quite sandy, both at the top and at the bottom, and sometimes this gradation is so gentle that it is impossible to define the limits of clay and sand. The clay is most generally bluish-white, excepting where it has been faded by long exposure to atmospheric agencies. But in nearly all pits this shade is diversified, and the clay appears red or mottled red and white, by the presence of ferric oxide, which exists in it as a foreign or accidental constituent. Pyrite is another occasional constituent, although rare in the *best* clay of the bed. It is more generally seen in the inferior and sandy portions. Lignite has also been seen, but it is not common in these fire-clay beds, although very abundant in some of the dark-colored black clays that lie between these fire-clay members. The composition of the fire-clay of this bed does not materially differ from that of the South Amboy bed, and the following average of seven analyses of as many specimens, each representative of a locality, shows this composition:

Silicic acid	43·22	Magnesia	0·11
Alumina	38·94	Ferric oxide	0·81
Water (combined)	13·71	Titanic acid	1·35
Potash	0·30	Sand (quartz)	1·31
Soda	0·17		
Lime	0.15	Total	100·07

The specific gravity of this clay is 1·705—1·814, the more sandy clays being a little heavier.

Above this bed there is a layer, known locally as *top-white* or pipe-clay, which is fusible at a high heat, and which is sometimes classed with this fire-clay. It is distinguished by its darker color, more sandy character and the higher percentage of potash, sometimes amounting to two per cent. The red clays of this bed, as also of the South Amboy bed, contain varying amounts of ferric oxide up to seven per cent. Such clays, known variously as red, spotted and mottled, are not so refractory as blue or white sorts. Generally they are more sandy and also less uniform in texture. They are used in No. 2 fire-brick sometimes, but more often in drain and sewer pipes, and in saggars and stove-linings. The best clays are put in the market as No. 1 fire-clay, or as *fine clay*. These are the rich aluminous clays represented by the composition above given. The more sandy portions are nearly as good fire material, in some places quite as good as the more *fat* varieties, but they are not ranked so high, and are classed with the No. 2 grades. Wherever the bed is impregnated with pyrite, that part of it is dug by itself and sold separately (if it benot sandy) for alum making. Selected lots which are particularly free from any oxide of iron, or other foreign constituents, are also separated for white ware. This *ware clay* is *softer*, more friable, and has a more decided conchoidal fracture than the fire-brick clay. A *paper clay* used in glazing wall-paper, is got in some of the pits. This needs to be very fine and free from grit. Sometimes it is prepared by washing the clay, by which means the sand and pyrite and other constituents foreign to the clay are removed. All these grades of ware, paper, fire-brick, retort and alum clays belong geologically in these beds, being found at nearly all of the pits in both this and the South Amboy beds. They are variations only, and are found going vertically, not horizontally, through each of them, although not always in the same order of succession. Commonly, the best clay is in the middle horizon, grading off toward top and bottom into varieties of less value.

These clays constitute the great mass of all the fire-clay exported from the State; and they supply most of the fire-brick material for the works of the Atlantic slope.

The *Laminated Clay and Sand* forms the most of the dark-colored red-brick material, which is dug in such large quantities along the tidal waters of this district. It furnishes a very superior brick-earth for making a strong and durable building brick. The yards at Washington and along the South and Raritan Rivers all use these clays and sands.

(TO BE CONTINUED.)

COST OF PRODUCING OIL.—A writer in the Titusville *Herald* has made a calculation, showing that the average cost of producing a barrel of crude oil at the wells from 1867 to 1877 has been $2.30.

LARGE FURNACE SALE.—The *Iron Era* says the Minersville, Pa., furnace, which cost $162,000—every cent of which was paid by our citizens—and was one of the best furnaces in Pennsylvania, is to be sold by the Sheriff.

THE LOUISIANA SALT DEPOSITS.—The great deposit of rock salt in Petit Anse Island, La., is known to extend over 165 acres, covered by sixteen feet of soil. Its bottom has not been reached on boring down eighty feet. The salt is procured in solid masses of pure crystal by blasting.

THE STANDARD OIL COMPANY IN THE HANDS OF A RECEIVER.—In the equity case of H. L. Taylor and others against the Standard Oil Company for $2,000,000, before the Butler (Pa.) County Court, Judge McJunkin has filed the order for a receiver, placing his bond at $300,000. Thomas McFarland was appointed Receiver; he is well known throughout the oil country, and an employé for several years of the partnership now sought to be dissolved. Mr. McFarland will at once take possession of the production and begin the adjudication of the accounts.

THE NEW WORKS AT CLAUSTHAL FOR DRESSING ORES.

Written for the Engineering and Mining Journal by John C. F. Randolph, M. E.

[*Continued from page* 168.]

(WITH SUPPLEMENT—NO. VI.)

THE BUILDINGS.—(CONTINUED.)

The Middle and Fine Crushing House.—The arrangement of this building is shown in Figs. 28, 29 and 30. Its location on the general plan is marked (8). The side product from the coarse jigs which needs still further reduction in size to exhibit the mineral in it free from rock, enters the building by cars on the upper story from the ground level of the coarse jigging house. It is tipped into the feeding hopper *a* from which it is fed by the feeding roll *c* to the middle rolls *b*. The crushed material falls with water through a trough *d* to the jarring grate *e* with bars 4mm apart. That which fails to go through the grate goes to the fine rolls *g* to be further crushed. The portion passing the grate passes beneath the fine rolls into the trough *f*, since it needs no further crushing, and, together with the product from the fine rolls, enters the upper one of the pyramidal set of fine screens. The action of these screens has already been detailed. In addition to the material from the rolls, the fine stuff collecting in the zinc funnels beneath the coarse screens in the coarse crushing houses above is brought by the launders *E* (Fig. 29) to the fine screens. The method of the introduction of this last material into this building is not completely shown in the drawing. The various sizes produced go to their respective lines in the manner shown on the right hand side of the front elevation. All these bins have inclined bottoms with a fine sieve on the upper part for draining off the water. All the stuff below 1mm, however, is caught in a zinc funnel *h* below the finest drum, and is carried at once to the neighboring single-sieved sand jig *p*. The muddy water from each set of screens goes to a large spitzkasten, *i*, from which the settled slime, and also the jigged slime from the sand jigs, goes into the pipe *m* and through it to the auxiliary washing house. The partially cleared overflow from the spitzkasten and sand jigs, and the water from the turbine *s*, go by launders not shown into the cement-lined trough *n*, and by it to the settling tank *o*. Both *n* and *o* are beneath the floor. The water for the crushing, screening and jigging comes from the settling tanks above by the pipe *w*, and all not used for this purpose discharges into the settling tank *o*. The power of the turbine *s* is transmitted to the main shaft, from which it is distributed by belting to the various apparatus, and also to the building above it and below it. The power of this turbine can be at any time augmented, or even supplemented, by connection with the adjoining steam engine marked (14) on the general plan of the works.

(TO BE CONTINUED.)

THE STRENGTH OF WROUGHT IRON AS AFFECTED BY ITS COMPOSITION AND BY ITS REDUCTION IN ROLLING.

[Abstract of a paper by A. L. HOLLEY, read before the Am. Inst. of M. E., Philadelphia, February 27, 1878.]

This elaborate paper we shall publish in full, in advance of its distribution by the Institute in pamphlet form. As the author remarked, before reading parts of it at the meeting, it is impossible to follow such an investigation critically, without having all the data spread out in convenient shape for reference. We will, therefore, confine this abstract to a statement of the kind and character of the data, and to the more important conclusions derived from them.

The United States Test Board has recently completed, under the able superintendence of Commander BEARDSLEE, a series of not less than 2,000 tensile tests, each showing elastic limit, elongation and reduction of area, 14 standard brands of wrought iron, the tests having been made on bars 1 to 2 in. diameter, and on chain-cable links and short chains. There are also 42 complete analyses (including slag) of these irons. All the physical results are condensed in the various convenient tables.

Each iron is described in detail, and its physical character is, as far as possible, traced to its chemical character. Then the whole group of irons which phosphorus, for instance, is likely to have affected is discussed, and a conclusion is reached regarding the effect of phosphorus. Then silicon, and the irons which it has affected, are similarly considered, and so on, through the series of altering ingredients.

A marked superiority in the strength of the small bars of the same iron having been observed, this fact was ascertained to hold good for various, and presumably for all irons, and its cause was found to be the greater reduction of the piles which formed the small bars, during the process of rolling. The proportion of reduction to variation of strength was got at by numerous experiments at the rolling mills. And it was ascertained by another complete series of experiments, that by employing the same percentage of reduction, from pile to bar, the large and small bars of any given iron showed nearly uniform tenacity and elastic limit per square inch, within the range of 1 to 2 in. diameter. The rule probably holds good within a much larger range.

Effects of Phosphorus.—This element varies from 0·065 to 0·317 per cent. While its hardening effects may be traced in some special bars, those of the whole group of irons which contain the least phosphorus are not the softest and most ductile, while those that contain the most are not the hardest and most brittle. Other disturbing elements, especially differences in reduction, quite overwhelm the effect of this element, which is pretty uniform outside of the extremes mentioned. In this group of irons, phosphorus 0·20, did not seem to harm them for chain cable purposes (which require great ductility and high welding power) when carbon was kept under 0·05 and silicon under 0·15 per cent.

Effects of Silicon.—This ingredient varies from 0·028 to 0·321, but in the best irons it averages under 0·15 per cent. Decrease of general strength with increase of silicon may be observed in some cases, but the effect is not regular for the reasons mentioned under the head of phosphorus.

Effects of Carbon.—This varies from 0·15 to 0·07 in the irons of the group excepting one, and, even within these small limits, obviously increased strength a little and decreased welding power. One iron contained carbon from 0·21 to 0·51 and was thus a "weld steel" or puddled steel. The increased tenacity, decreased ductility and bad welding powers were very conspicuous, and were unmistakably traced to this high carbon.

Manganese was so low in all the irons (0·11 in the highest) that its effect was quite lost. *Copper* was very low in all the irons but one, and in this it did not affect strength, although it seemed to impair welding power. *Nickel and cobalt* were rather high (Ni. 0·10 and Co. 0·34 maximum) in one iron, but did not affect strength. *Sulphur* was extremely low throughout the series, and had no influence on strength or welds. *Slag* probably weakened the irons in which 1½ to 2 per cent. were present, though its effects were not conspicuous.

Welding is discussed at great length, the author concluding, chiefly from the perfection of welds in use, however impure when melted, that this property is chiefly dependent on the mobility of the mass, and that impurities impair it only by interposition, and not by changing the molecular motions of the mass. Probably all metals can be pretty soundly welded under suitable conditions—chiefly those of temperature.

The effects of ingredients are then reviewed. Silicon in oxidizing has been supposed to help welding by setting silica free where it is wanted as a flux to protect the iron against oxidization. These experiments certainly do not confirm the theory; they may not disprove it. Copper may possibly be neutralized by cobalt or nickel. The iron, having much Cu., welded very badly except the bars which also had high Ni. and Co., and these welded very well. The effect of phosphorus on welding was not conspicuous; that of carbon was; that of the extremely low sulphur present was not discoverable; slag as high as 2¼ per cent., when compared with 1 per cent., other conditions being uniform, while it weakened the iron a little, could not be traced in its effects on welding. The bars of the same brand of iron, which were most worked in the rolls, had also, in some cases, the most slag. The influence of more or less condensation in the rolls was notable. The least worked irons welded best, although they had the least tenacity.

While these analyses do not uniformly account for physical properties, it must be remembered that the irons were purposely made as nearly as possible to one standard, by makers who knew generally what was wanted. To have got at differences due to composition, the greatest variation should have been made, first in one element and then in another.

But these analyses have been most useful in showing, in a somewhat astonishing manner, that, with uniform ingredients, there is another great cause of variation—in showing that differences in reduction from pile to bar caused as much variation in physical qualities as did the differences in the chemical composition of the whole series of irons, excepting the one steely iron. The highest difference in tenacity due to varying reductions is about 9,600 lb. per sq. in. The highest difference from this cause between 1-inch. and 2-inch. bars is 8,900 lb. But the highest difference between average tension resistance of all the irons (excepting the steely irons) due to all causes, is but 7,100 lb. As already remarked, these results led to experiments which proved that large bars can be made as strong as small bars by proportionally increasing the sizes of piles.

Want of uniformity in the composition of the same brand of iron, all intended to be of very fine quality for the peculiar use of chain-cable, is conspicuous. In one of these brands silicon varied from 0·16 to 0·26; in another, from 0·18 to 0·32. In one brand phosphorus varied from 0·09 to 0·35; in another, from 0·12 to 0·24; in another, from 0·14 to 0·29. Such variations can hardly be helped in puddled iron, as they depend so largely on the skill of the puddlers, but they are quite unnecessary and altogether inadmissible in steel.

The experiments show, on the whole, about what the composition and the treatment in manufacture of good cable irons should be. They show that the amount of reduction must be just as carefully considered as the pig-iron used, and that, as compared with ordinary working, several thousands of pounds tenacity may be added to the larger bars by improved processes of manufacture.

It would be impossible to go over, intelligibly, the various results which Commander BEARDSLEE has derived from, or confirmed by, his physical experiments, within the limits of this abstract. Some of the most important are: That previous rules, in which fitness of materials have been based un ultimate tenacity, are wrong, and that elastic limit and ductility, also welding power, are more important elements; that the ordinary studded cable link is weaker than the unstudded link, and that the ordinary short tub piece may show 30 per cent. more strength than a test piece 5 diameters long, and is hence perfectly unreliable.

It seems proper to remark here that, while this paper shows but a small amount of the work which the U. S. Test Board has already completed, these results alone are worth vastly more to constructors than the sum which Congress has doled out; and they show that when the large testing machine, now being set up, is done, a liberal appropriation should be made, to pursue these most important investigations.

PHOSPHORUS.—Germany makes one-half of the phosphorus consumed in the world, or over 250 tons annually.

THE SITUATION OF THE PARIS COAL TRADE is given in very gloomy terms by *La Houille:* "The horizon of the coal trade grows daily more overcast. Prices are falling, and the winter's campaign, which we may look upon as over, is marked by an absolute standstill in business, while the Paris depots are all full of unsold stock. Household requirements had been depended on for clearing off large quantities of best coals; and Belgium, England and France had raised their quota of supplies to the full level of an ordinary and normal period of business. Collieries in the Pas-de-Calais had gone the length of selling up new plant, which has become useless in view of the comparatively modest amounts of which they succeeded in disposing. Best sorts are as low as £2 in Paris, delivered at the house, and seconds are a few francs lower, but the increase of business due to the stimulation of these low prices is insufficient to give turn to business, and large dealers have condescended to come down to the sale of single sacks, and have thus, perhaps, succeeded in turning over a portion of their outlay. A curious example of the eagerness, in these hard times, to turn an honest penny is afforded by the action of a large steamship company, which, according to *La Houille*, receives a subsidy for carrying the French mails. This company finds it largely to its advantage to burn English coal, and its ships are therefore provided with it in sufficient amounts; in fact, very large amounts. So that if it can find retail customers for its surplus coal it is quite willing, as it is quite able, to forward parcels of it to any of the Paris railway stations at rates below even that of English coal in the French market. An interpellation on the subject is stated to be about to be made in the Chamber of Deputies. In the Nord the tendency is said to be in an upward direction, the iron trade being disposed to lay in supplies of fuel.—*Iron.*

Fig. 28

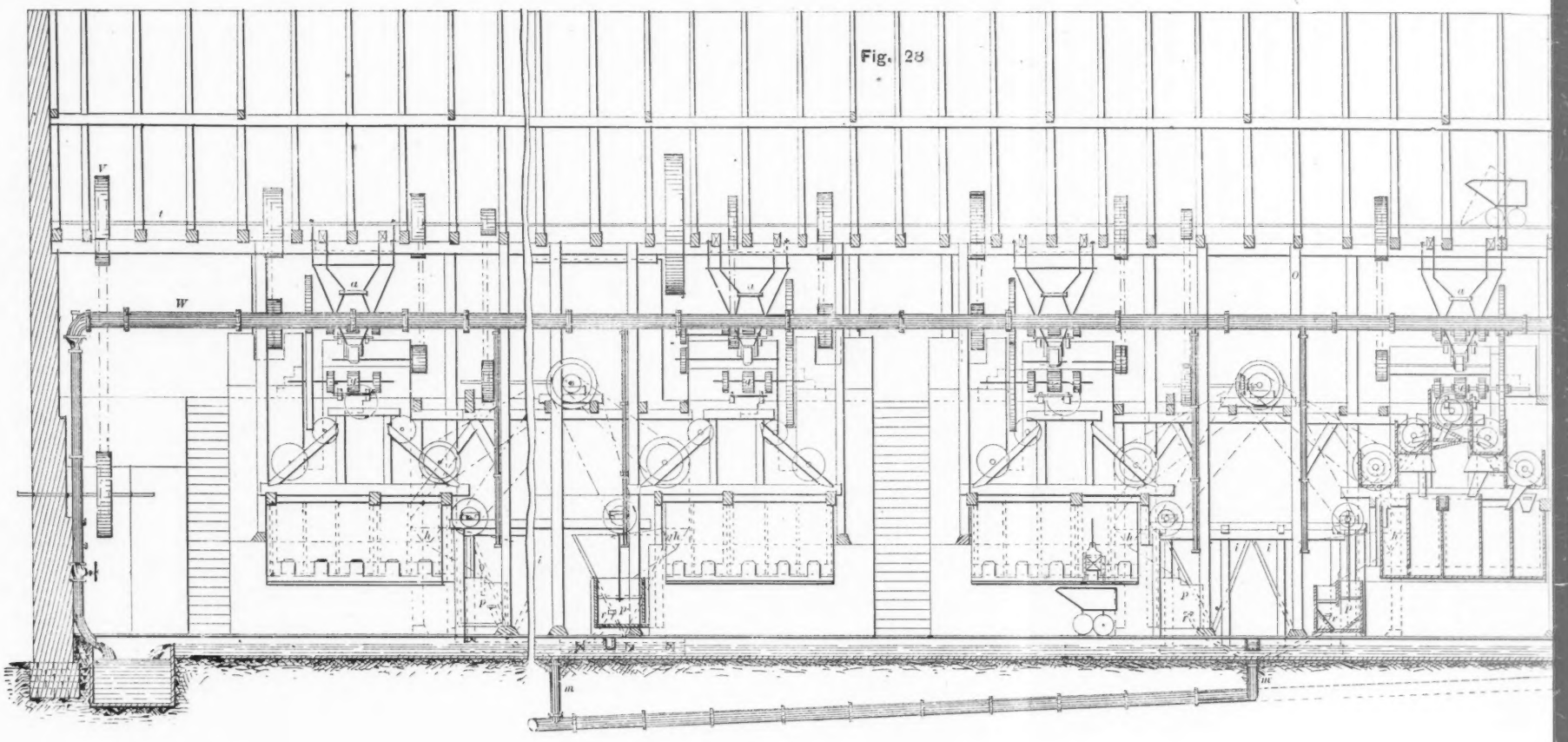
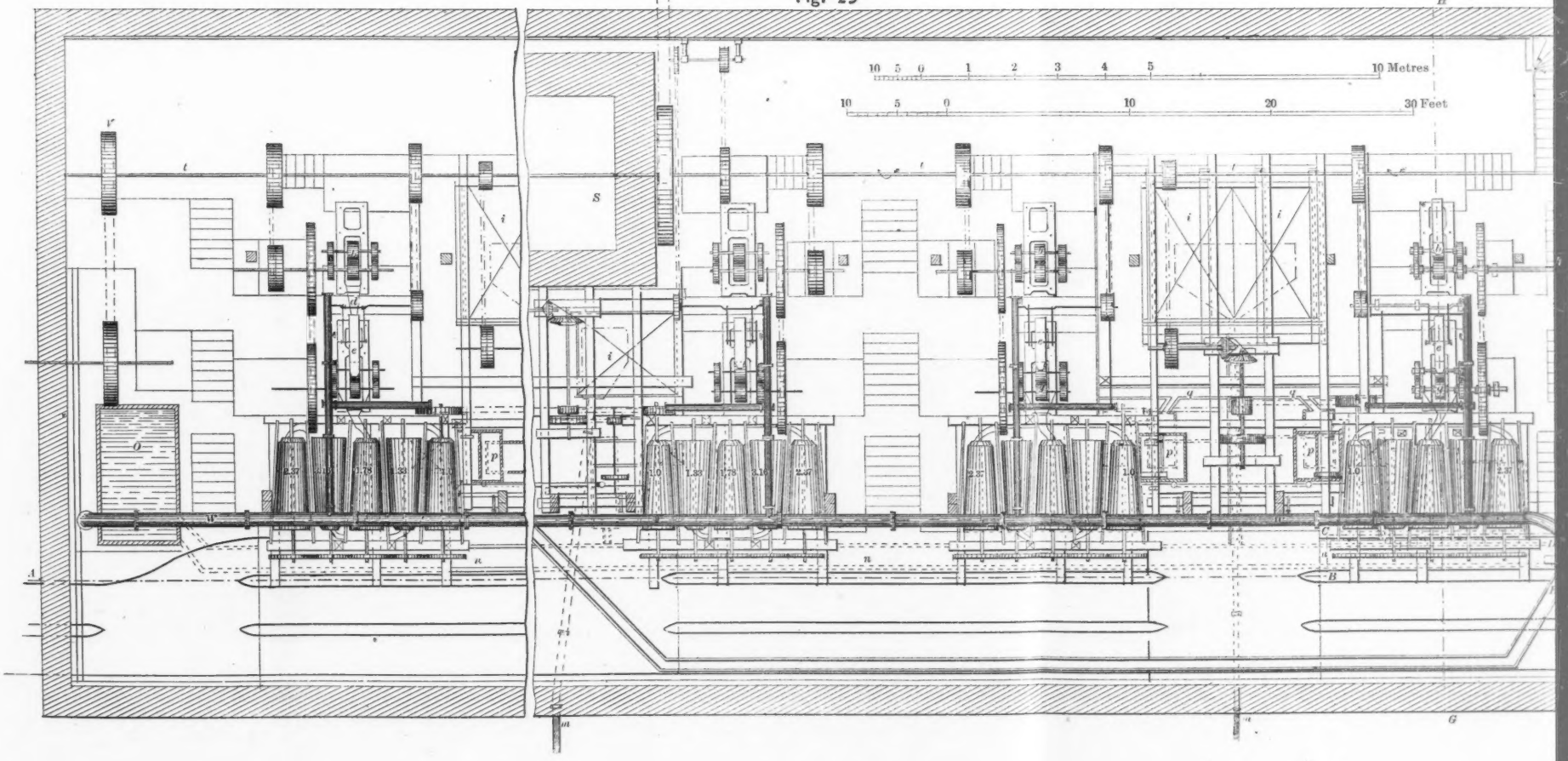
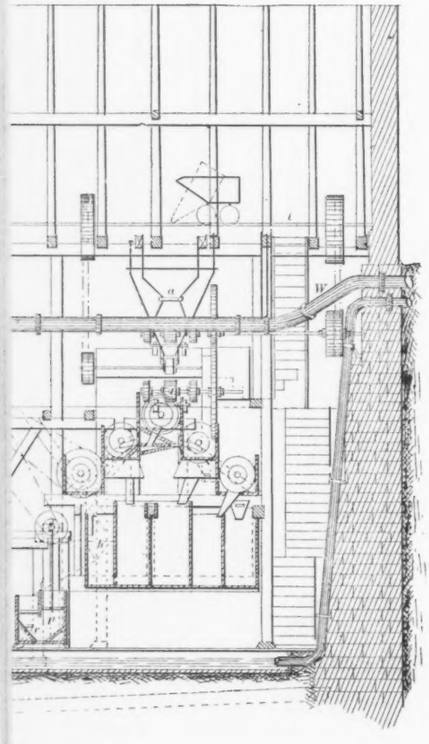
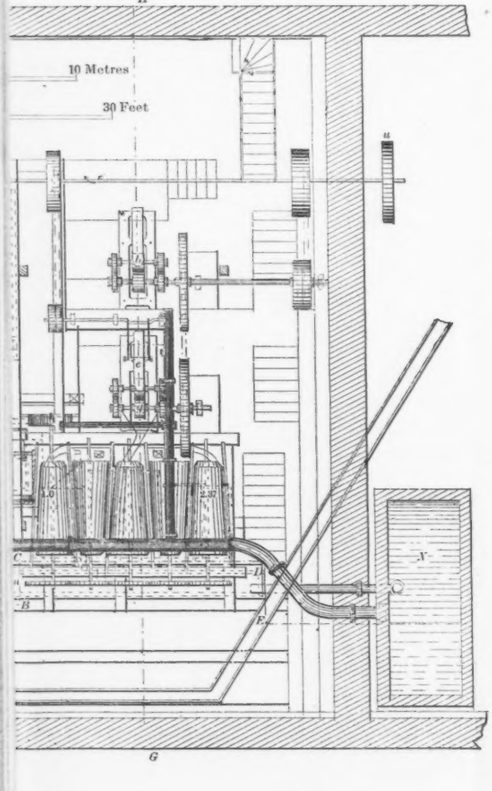


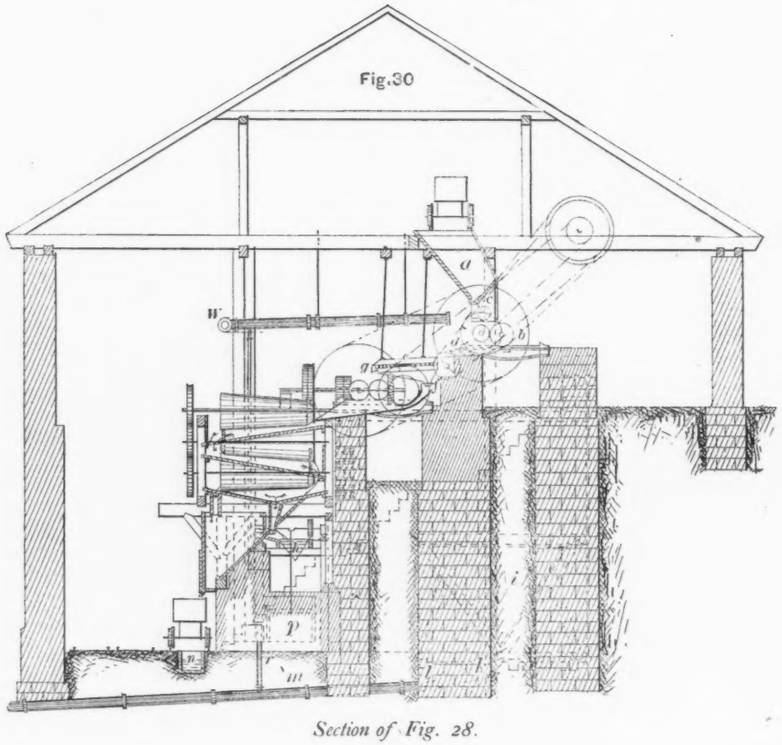
Fig. 29



THE NEW ORE DRESSING WORKS AT CI







Section of Fig. 28.

REGISTER.

Figs. 28, 29, 30—Middle and Fine Crushing House.

THE NICKEL ORES OF OXFORD, QUEBEC, CANADA.

By W. E. C. Eustis, A. B. S. B.

[A paper read before the American Institute of Mining Engineers at Philadelphia, February 28, 1878.]

In September last I had my attention called by Mr. R. J. LECKIE, one of our members, to a deposit of nickel in the township of Oxford, province of Quebec. In many ways it has proved to be a subject of great interest. As this one is, as far as I can learn, entirely new in mineralogy and metallurgy, it has seemed to me that it would be a matter of interest to the Institute to have laid before it in a short paper the peculiarities I have met with in studying it.

This deposit of nickel was first described by Dr. T. STERRY HUNT, our President, in the geology of Canada (up to) 1863, p. 738, in the following terms:

"The general diffusion of nickel throughout the Magnesian rocks of the Quebec group has been already noticed. It has, however, never been met with in any considerable quantities in these rocks, although workable deposits of ores may reasonably be looked for in some parts of their distribution. On the sixth lot of the twelfth range of Oxford the sulphuret of nickel (millerite) is met with in small grains and crystals disseminated through a mixture of green chrome garnet with calcspar and through the adjacent rocks.

"Explorations were made at this place a year or two since in the hope of obtaining copper, which was supposed to be indicated by the brilliant green of the garnet, or lead, small quantities of which are found in the vicinity.

"The ore of nickel is sparingly disseminated in small grains through the garnet and calcareous spar, and the masses submitted to analysis did not yield more than one per cent. of nickel. It is perhaps doubtful whether this small quantity could be extracted with profit."

On page 497 is the following:

"It (the garnet) forms granular masses, or is disseminated with millerite in a white crystalline calcite. The largest crystals are found in drusses in the massive portions, but do not exceed a line in diameter, and are dodicahedrons with their edges replaced. * * * The garnet closely resembles the ouvarovite of the Urals.

"This beautiful garnet, if obtained in sufficiently large crystals, would constitute a gem equal in beauty to the emerald."

My first visit to the mine occupied several days. We were encamped on an island in Brompton Lake. A half mile distant lay the nickel mine, in the side of a hill. On this deposit there are two shafts, being sunk 180 feet apart, No. 1 is down 41 feet, No. 2, 45 feet.

At the present depth of No. 1 the vein has an average width of 9′ 9″.

The hanging wall is a magnesian limestone; the percentage of magnesia is, however, small. The width of this has not yet been determined, but on the surface other smaller veins of the spar and garnet are visible.

The foot wall, a dark-colored serpentine, is very clearly defined.

At a considerable distance south of No. 1 shaft the line of strike is cut at right angles by a sharply defined band of clay slate.

The vein now consists of pretty much the same as before described in the *Geology of Canada*, viz., green chrome garnet, calcite and millerite; besides these, small particles of chromite are found. There is no trace of copper or cobalt present, possibly a trace of arsenic, though I have not thoroughly established that yet. The hanging wall carries nickel in small grains.

The following analysis gives a fair idea of the composition of the vein:

Calcite and millerite	50·4 per cent.	Chrome garnet	43·73 per cent.
Block specks (chromite)	6·87 "		
			100·00 per cent.

No. 2 shaft has not as yet got below the decomposed spar, but has reached good solid nickel ore.

It was started on the vein in decomposed spar and pyroxene, carrying occasional small masses of chrome garnet. The vein here is fully as wide as in No. 1 shaft.

The pyroxene has the following composition:

Silica	47·15	Oxide of calcium	11·35
Alumina	3·45	Water	5·83
Oxide of iron	8·73		
" magnesium	24·55		101·56

(*Dana's Mineralogy*, page 221.)

Coming back now to the specimens before us, the chrome garnet is the beautiful green crystal, a rhombic dodecahedron of the isametric system. It remains absolutely untouched in hot, strong aqua regia. I am still in hopes of finding crystals in some of the many drusses which occur in the vein, large enough to show their beauty to the naked eye.

The specimens which I have here will require a glass to bring out their beauty.

In the ore near the surface, which only was accessible at the time the *Geology of Canada*, quoted above, was written, the millerite occurred only in grains, as there described, but as the shafting has gone down, the crystals have increased in size, till now we have the large ones shown here, giving the characteristic needles very plainly. Sometimes these occur in clusters of needles, placed side by side, as it were, forming a flat plate.

It (the millerite) varies in color greatly, according to the depth.

In the samples shown from No. 2 shaft there appear two distinct differently-colored metallic sulphides, and this was the case with specimens from No. 1 before it got below the decomposed spar.

At first it was supposed that magnetic iron pyrites or other sulphides might be present, but the analyses go to prove it all to be millerite.

At first I had grave doubts about the practicability of treating the ore, owing to the infusibility of the chrome garnet. At the best I expected to have to add fluxes, but the results have proved quite the contrary.

The first experiments were made in a SIEMENS furnace. A black lead crucible full of the ore was placed on the bank of the furnace, while making low steel.

Looking at it fifteen or twenty minutes later, I was surprised to find it liquid. It was poured into a mould and a good button obtained. It was more ductile than the pieces shown, and had the yellow color to a greater degree when polished.

Next, 508 lb. of the ore, with no flux whatever, were run through a small blast furnace about a foot square inside and 4 ft. high, gas coke being used as fuel.

Ten minutes after the ore was charged into the furnace, slag appeared at the tap hole.

The whole charge was run through in 2½ hours. 145 lb. of coke were used, making about 3·5 of ore to 1 of coke. 8 lb of this matter or alloy were obtained, containing

Iron	71·84 per cent.
Nicke	22·70 "
	94·54

Fe and Ni = 94·54 per cent.

The ore treated was a very lean lot from near the surface, probably not containing ½ per cent. of nickel. The slag had a mere trace of nickel.

As to the further treatment of this product I am not prepared now to make any report. *Primâ facie* it would seem that the problem was a simpler one than most nickel manufacturers have to face, since there is no copper or cobalt present, but not finding it spoken of in the books on metallurgy I have been obliged to investigate as I have gone along. My progress has consequently been slow.

At some future time I shall hope to give the results of the present investigation. I shall hope at the same time to be able to report some progress in extracting the chromium in some merchantable condition. Inasmuch as the slag produced must contain somewhere about 6 per cent. sesbuioxide of chromium it becomes extremely valuable, provided it can be extracted easily, but while some slags produced yield it up with great readiness others yield it up with difficulty.

As to the per cent. of nickel which this ore carries and which will determine its money value, it is hard at present to speak with any certainty. At the bottom of No. 1 shaft, pieces taken to be average ones for ¾ the width show between 3 and 4 per cent. nickel; specimens from No. 2. look equally rich. What is to be the average yield after the mine is opened up it is impossible to say.

I have brought this ore, which I fancy is new to many of the members, before the Institute; I hope it will not, because it is new, have proved uninteresting. If this paper should lead to any light being thrown on the metallurgy of it, I shall be only too glad to have read it.

REMARKS OF DR. HUNT.

In discussing the foregoing paper, Dr. T. STERRY HUNT, after alluding to the fact that Mr. EUSTIS had quoted from his description of the Oxford mine, given in 1863, proceeded to refer to the peculiarities of the deposit. It is what by many would be called a contact-vein, between serpentine on one side and limestone on the other. He regards it, nevertheless, as a true or fissure-vein lying in the plane of the bedding, and in support of this view he mentioned the fact that in one place a branch from it penetrates the limestone wall. The aggregate of calcite, green chrome-garnet and chromite with millerite is of great interest to mineralogists. White pyroxene crystals are found in the same gangue, analyses of which, as well as of the green garnet, had long since been made and published by the speaker. The crystals of millerite are remarkable for size and beauty, some of them being an inch long, and shorter tabular crystals being nearly half an inch in breadth. Small crystals of pea-green epidote are rarely found in the same gangue.

In allusion to the statement quoted from the speaker's former description in the *Geology of Canada*, where the rocks holding this vein are referred to the altered Quebec group, as it was then called, Dr. HUNT explained that the view that these crystalline schists were altered palæozoic deposits, which he formerly accepted, in accordance with the opinions of many American geologists, had long since been rejected by him as untenable. In 1871, he had expressed the conviction that the rocks in question were more ancient than the uncrystalline palæozoic fossiliferous rocks of the St. Lawrence (which have been variously called the Hudson River, the Upper Taconic and the Quebec group), and they were to be referred to the Huronian period of eozoic time. He added that the results obtained by the geological survey in 1876 and 1877 had, in the opinion of Mr. SELWYN, its present director, fully vindicated this latter view. These results will probably soon be officially made public.

PROGRESS OF COAL MINING IN NEW BRUNSWICK.—The Anthracite Coal Company of New Brunswick are pushing forward their works at Point Lepreaux. A shaft is already sunk to a depth of 160 ft., and 40 ft. further will reach the coal-bed. By the 1st of May the coal is expected to be in market.

DECLINE OF BRITISH TRADE.—Between the export and import trade of Great Britain there is a vast chasm which is represented by what is called a balance of trade against the country, which is believed to have reached $726,000,000, in 1877. In 1859 this balance was $117,500,000; next year it was nearly twice as much, and for several subsequent years the average was about $275,000,000. In 1872, which was accounted a year of great prosperity, the figures sank to $200,000,000; next year it was one-third greater, and in 1874 had risen to $362,000,000; in 1875 the amount reached $461,000,000; in 1876 $592,000,000; and it is estimated by the *Times* to have been $726,000,000 last year, for which the imports are known, the exports still being a subject of estimate. As a creditor nation to a large part of the globe, what passes for an adverse balance is often a normal state of things in Great Britain. Much of what is owing to her yearly comes in the shape of produce. But there is reason to believe that in the adverse balance of last year there is something more than the adjustment of the equilibrium. Beyond what was coming to the nation on account of foreign loans, $24,547,305 was sent out of the country in gold to adjust a balance which there were no other means of meeting. The exports to the United States, France and Germany have declined, each of these nations having learned to supply its own wants to a greater extent than before. In 1872, an exceptional year, the exports of iron and steel reached $180,000,000; last year the figure dropped to $100,000,000. In the first of these two years woollen and worsted manufactures figured up to $161,000,000; in the last they were only $86,700,000. It is probable that the apparent prosperity of 1872 was to a considerable extent delusive—that an exceptionally large part of the exports were not paid for. In any case the decline is very striking. In that year the total value of the exports was $1,281,000,000; last year it was only $993,000,500. Last year the imports of grain were greatly in excess of those of 1876: wheat 22 per cent., flour 24, barley over 30, oats 15. The country is becoming gradually less and less capable of supplying itself with food. In 1857, when there were no longer any corn laws to restrict the supply of foreign food, it only reached $10 per head of the population; in 1876 it had risen to $25, and was last year still greater. No one pretends that the state of British trade is satisfactory. There is wide-spread distress among workmen in several branches of industry, who are thrown out of employment. No wonder that British manufacturers are anxious to force their goods on foreign and colonial markets.—*Monetary Times, Toronto.*

MINING NEWS.

COLORADO.

[*Special Correspondence of Engineering and Mining Journal.*]

San Juan.—San Juan miners are beginning to make preparations for the summer campaign. The smelting works of Greene & Co. at Silverton will probably resume work next month, and thereafter are expected to run both winter and summer. These works are to be enlarged. Lewis Crooke is expected back from New York this month to start up the Crooke smelters at Lake City. These are supplied by the Ute and Ule mines, owned by the firm. The Ocean Wave custom works will resume in May, and possibly one or two establishments at Ouray. The Highland Mary lode, at Cunningham gulch, is reported sold for $125,000, and the Saint Joseph purchasers may erect reducing works. About 100 miners are working among the mines around Mineral City this winter. This point is located at timber line in San Juan County, eleven miles above Silverton. The famous Aspen lode near the latter place has nearly $30,000 worth of ore out ready for Greene's smelter. Communication is kept open between Silverton, Ouray and the world by means of the mail carrier and his diminutive pack animals, and the trail is extremely narrow and dangerous in many places among these snow-clad and precipitous mountains. Snow slides or avalanches are of frequent occurrence, and several lives have been lost. Navigation by means of snow-shoes is practiced by both sexes, and this is the first winter when mail carriers dispensed with this means of locomotion.

Gilpin County.—Among the gold mines of Gilpin County the usual activity is displayed. Fullerton & Kimber now own the Grand Army, or western 800 ft. of the Gunnell, and will proceed at once to enlarge the 500 ft. shaft and use it for hoisting purposes. Their ore is mostly in this part of the vein. The Pleasant View mine, which has been idle for some time, has steam up again, and will be worked steadily. The First National Kansas will soon be operated quite extensively. The shaft through which the California is now worked will be 578 ft. deep before the close of April, and that of the Monmouth-Kansas 875 ft. The latter has 15 ft. of five-ounce ore in the bottom. The Bobtail and Briggs companies are making money on three-ounce ore. Joseph W. Holman has had the Cashier mine opened and capital has been raised to operate it in a very extensive manner. Four and a half cords of ore from the 300 ft. level of the Flock mine gave 71 ounces of gold, worth $1,070, last week, being $238 per cord, or $34 per ton. D. G. Wilson has driven the Central City Tunnel into Quartz Hill a distance of over 350 ft. One cross vein is worked by a chaft sunk from a point beside the tunnel. The O. K. mine has its new steam hoisting machinery at work. The Williams silver lode is paying largely. Robt. Teats has the Gilpin and Conley mines, near the smelting works at Black Hawk, reopened, and is getting some valuable ore. These mines employed 100 men in 1870, but have since been idle.

The Colorado Central Railway will be extended from Black Hawk to Central, early in April. While these places are really one continuous settlement, the necessity of gaining an elevation of over 500 causes the road to wind around mountain sides and up and across gulches for a distance of nearly four miles. A number of Central and Black Hawk's most enterprising citizens have just completed the finest opera-house between St. Louis and Salt Lake. It cost $21,000, and the two opening performances of an amateur operatic and dramatic company netted $800 over all expenses, showing money to be plentiful in these mountain mining towns. Five Colorado railways are extending their lines into the mountains south and west, and the Colorado Central is projecting extensions in several directions. These railways are proving of great benefit to the miners.

Gilpin County's bullion export in February was slightly in excess of that of the preceding month. The Kansas quartz mill is to be enlarged.

A Worthington Duplex pumping engine is being placed in the bottom of the main shaft of the Bobtail Company's mine. Among the lodes now worked are the Topeka, Saratoga, Calhoun and others in Russell district, the Alps, three mines on the Gardner, two on the California, three on the Burroughs, the Hidden Treasure, Roderick Dhu, Pyrennes, Kent County, Lewis Shanks, Columbia and Mackay extension on Quartz Hill, the Jones, Hubert, Prize, Eureka, Wood, Irene, Centennial, Furnald, Ellery, Dallas, Fisk, Bates, Minnie, Sleepy Hollow, Smith, Running, and nearly fifty other veins in various localities near Central and Black Hawk. Lin Son, the leader of the Colorado Celestials, is buying gulch claims, and has one hundred Chinamen on the way from China. He has two hundred in Colorado already.

Boulder County.—Times are improving in Boulder County, due to the increased production in the telluride belt and the Caribou silver mines and to the valley farming product of 600,000 bushels of wheat, etc. Last week Henry Neikirk received a check for a little over $10,000 from the Boston & Colorado Smelting Company for ore obtained from the Melvina lode in February. Near Springdale, the Mountain Chief is the great attraction, while the Grand Central, Big Blossom, John Jay and Last Chance are paying handsomely. Some time after the Smuggler mine was shut down because it failed to pay, a number of the employés secured leases of portions of the mine, paying the unusually large royalty of from 45 to 55 per cent. of the gross receipts. This would indicate some crookedness in financial matters on the former alleged unprofitable management. There is no little dissatisfaction among some of the stockholders. The American is said to be doing much as usual. The Caribou mine is nearly 700 ft. deep and portions of it are paying the leasers and owners good profits. The great Nederland mill is now in operation on Caribou ore, with stamps, Frue Vanner concentrators, Bruckner cylinders and lixiviation vats and tubs. If the No Name mine owners would sink their shaft 150 ft. further it would pay them well.

The West Denver lixiviations were recently started up by the new owners, and shipped a silver bar a few days ago.

Clear Creek County.—Another splendid discovery has been made in Clear Creek County. It is called the Joe Reynolds, after the famous Chicago grain dealer and steamboat man, who is heavily interested in the Free America, Diamond Joe and other mines. The location is near Silver Creek, on Columbian Mountain, on the opposite side of South Clear Creek from Red Elephant. Although but a few feet in depth, from $800 to $1,500 worth of ore has been obtained daily during the past week. The ore vein is now 18 inches wide. Some runs have gone as high as 1,000 ounces per ton in silver, but much higher assays have been obtained. Between 100 and 200 prospectors have flocked to the new camp, and extensions of the Joe Reynolds have been taken up for long distances. The locality being on the north side of the mountain, the prevalence of snow has retarded prospecting. To remedy this difficulty, fires were built on the mountain side to melt away the snow. New discoveries are reported almost daily.

Georgetown shipped 647½ tons of silver ore, worth about $120,739, in February, about one-half going to Black Hawk. This was a gain of nearly 20 per cent. over January. The silver bullion shipments and ore sent from the vicinity of Idaho bring the product of Clear Creek County up to nearly $200,000 for the month of February. F.

DAKOTA.

BLACK HILLS RESOURCES—ITEMS FROM A REPORT OF THE COMMITTEE ON NEW TERRITORY.—We take the following from the Denver *Tribune* of the 10th inst.:

"The gold yield of the Black Hills for the past year was $4,000,000.—Improvements in machinery and mills completed and in process of construction for the Father De Smet Company, $225,000.—The price paid for the Homestake Mine was nearly $100,000, and an eighty-stamp mill nearly completed for the same company, $100,000.—The price paid for the Golden Terry was $160,000.—The Giant brought $42,500.—The owners of the Reno Mine have refused $100,000 for that property.—One-half of the Rhoderick Dhu sold for $40,000.—The Hidden Treasure has netted its owners to date $100,000; pays for labor $6,000 per month, and has at present half a million tons of ore in sight, and could not to-day be purchased for less than $300,000.—The Fairview, Aurora, Keets, Old Abe, Gustin, Woolley, Alpha, Lincoln and Homestake No. 2 are mines equally rich, and have yielded their owners flattering returns.—There are 650 stamps at present in operation in the Hills. One hundred and fifty are nearly ready to begin work.—The Recorder's books show a record of 4,073 quartz locations in this district.—Placer mines in Deadwood Gulch produced as high as $60,000 each.—Lawrence County has three daily and three weekly newspapers, two churches, Masonic and Odd Fellows orders established, a bar association, and several miners' unions. Three daily stage lines run their coaches into Deadwood from Cheyenne, Wyoming; Sidney, Nebraska, and Bismarck, Dakota. The Bear Creek & Spearfish Ditch Company's ditch will carry 1,600 miners' inches of water, supplying and developing a section of country rich in mineral resources, second to none.—Thirty-two quartz locations in the Rawlings district lie in both Wyoming and Dakota.—Three hundred and fifty silver locations have been made in Bear Butte district.—Nineteen hundred and ten pounds of ore from the Florence mine, Bear Butte, reduced at Omaha in December last, yielded $1,204, a net profit of $583.20.—Population of Bear Butte, 600.—A continuous mineral bearing belt ninety-five miles in extent has been developed.—Three hundred and seventy-five quartz locations have been made in the Hayward and Rockerville districts. The population numbers six hundred souls.—Over 275 other locations in Custer and Pennington counties have been entered.—The Redwater coal mines have been prospected to a distance of over forty-three feet, and show a large body of coal.—The machinery for three large iron manufactories is now *en route* to the Hills.—Ground was yesterday broken for F. K. Holden's iron foundry at Central City.—One set of boring machinery has been delivered in the oil fields near Jenney's Stockade. Samples of this oil sent abroad have received unqualified indorsements.—Twenty-five saw-mills in the Hills have manufactured 7,000,000 feet of lumber during the past season.—Capital invested in the lumber interest of the Hills, $200,000.—The arable lands of the Spearfish, Redwater, Centennial and Belle Fourche valleys aggregate 90 square miles.—About $65,000 is invested in stock in the Spearfish country.—The agricultural product of the Spearfish region last season included 12,000 tons of hay, $40,000 worth of potatoes, three tons of cabbage, and about six tons of other vegetables.—The business firms of the Hills will foot up 2,000.

KANSAS.

REPORTED DISCOVERIES OF SILVER IN SOUTHERN KANSAS.—A special correspondent of the Kansas City *Journal* from Humboldt, Kansas, of February 23, says: "The excitement concerning the new silver mines is becoming more and more intense every hour. A daily stage line will be put on from here to the mines on Monday next. New and startling reports are coming in almost hourly. Teams are loading here with supplies and camping outfits. The lucky spot is located on the southeast quarter of section thirty-three, township twenty-six, and range fifteen. Already the site has been platted preparatory to the laying out of a city. It will be christened 'Silver City.' A newspaper will be started next, called the *Silver Star*. Four mining companies have been organized, and will commence work immediately. Up to-day noon, one hundred and sixty claims had been taken. Strong indications exist of there being silver, gold, copper and iron, but old miners who hold some of the claims differ as to whether any of these metals exist in paying quantities. At six o'clock this evening I received a report direct from the mines, which says: 'Two shafts have been sunk to the depth of thirty feet, and a strata of mica has been found. There are also strong indications now that gold has really been found.'"

THE GOLD MINES OF NORTH CAROLINA.

We are in recept of a pamphlet recently published under the auspices of the Mining Board of Charlotte, N. C. After memoralizing Congress for the appointment of a Commissioner to report and examine the mines of the South Atlantic States, a number of statistics are given relative to the mines of South Carolina, from which we make the following extracts: Of mines yielding the precious metals, there are at least 140 known to the Mining Board, situated in North Carolina, and about 40 in the contiguous parts of South Carolina. Gold is found in at least one-half of the State, but the portion productive on a working scale is considerably less, embracing about one-fourth of the entire area, 12,000 square miles. The best known mines are upon the central belt of granite stretching across the State in a N. E. and S.W. direction, with a width of 10 to 25 miles; the towns of Greensboro and Charlotte being nearly on its axis. To the east is a large body of slates, generally argillaceous, with a width varying from 15 to 50 miles; this region also abounds in mines, but it has been less explored. To the west is a still larger area, made up for the most part of gneissoid and schistose formations, and extending nearly or quite to the Tennessee border; this area, too, has a large number of mines, the most valuable deposits in which are placers and gravel washings. It is highly probable that gold was mined in this State as early as the Revolutionary war, but only in a small way by washing beds of streams.

By the year 1825 the Carolina gold mines had become well known at the North and abroad. A Legislative Report of 1830 puts the ascertained production at $500,000 per annum. The five years preceding the war witnessed a revival of mining industry, and a real progress was made toward a mastery of the methods of dealing with sulphurets in an economical and thorough manner. But the absorbing issues of that struggle diverted all efforts in this direction, and at its close but one mine was in operation, and that only in a fitful manner. The south end of the central belt has been most explored, and the larger number of known mines are within a radius of 20 or 30 miles of Charlotte. The most prominent mine hitherto in which has been the Rudisill; it comprises two parallel veins—easily operated by the same shafts—which have an average combined width of 8 feet. This mine, after standing some years, has recently been re-opened, and new levels driven from the bottom of the old pump shaft, at a depth of nearly 200 feet. The records of the past yield of the mine are defective, but it is credited with a production of $1,000,000. The old Charlotte mine, to the north of the above, has been worked to the same depth. Near by are the Sam Taylor, the Icehour and Carson mines. The Clark mine is about one mile west of the Rudisill. The Davidson mine, or group of mines, lie one and a half miles west. The Capps mine, five miles west of Charlotte, is another of the great mines of this section, and has yielded even more liberally than the Rudisill. The greatest depth reached is 200 feet. There are two converging veins, one of which, at its north end, passes into another property, and is known as the McGinn mine. Both veins are wide and strong, and have given superior ore. The McGinn mine is one of the few mines of this section now in operation, and is at present in "bonanza." The north end of the vein has yielded a high grade of copper ore, while the south end is for the most part auriferous pyrites. The Dunn mine, nine miles west of Charlotte, has three veins, one carrying copper.

The Stephen Wilson mine is nearly nine miles west of Charlotte; one vein on this property has been the most extensively worked of any in this section; it is entered by an inclined shaft on vein No. 2, and exploited by three levels, at 120, 200 and 300 feet respectively on the incline. The greatest length of the underground workings is 1,500 feet. The Frazier, Hipp and Todd, and some other mines are near by. The Kerns or Hopewell mine, 11 miles northwest of Charlotte bears iron and copper pyrites containing gold. The Ferris mine, five miles northeast of Charlotte, is another example of the copper bearing veins of this section. It has been worked to a depth of 90 feet. The Ferris, the Henderson, the McGinn, the Chapman and the Dunn mines are parallel, but at some distance apart. The Hunter, the Crosby, the Rogers and the Pioneer mills are from 12 to 17 miles nearly east of Charlotte; the mines of the last three carry copper pyrites in considerable quantity. The Newell, the Pharr and eight other mines are in this neighborhood. The Johnson, the Stinson, the Maxwell, the Bane, the Ray, the Tredenick and the Rea mines are from seven to nine miles nearly east of Charlotte. The Alexander and Caldwell mines, five and a half miles nearly east from Charlotte, have been extensively worked. The Harris Mine is ten miles from Charlotte in an easterly direction. The Elliott Brothers have recently discovered fine veins on their property, five miles from Charlotte. The Nolan, the Jordan, the Means, the Bennett, the Cathey, the G. C. Cathey, the Sloan, the Gibson, the McCorkel and several others, are near Charlotte. Concord, the county seat of Cabarrus County, is the centre of a large group of mines, of which twenty at least are widely known.

The Phœnix Gold Mining Company has a property of 200 acres, on which are several veins, most of which carry copper as well as gold. Most of the veins on the above property extend to the lands of the Vanderburg Mining Company, the ores being similar. The North Barrier, the South and the Middle Barrier mines are in close proximity to the Phœnix, and adjoining is the California Company's property. The Reed Mine, on Rocky River, about 25 miles northeast of Charlotte, is of historic importance. Gold was found here in 1799, and for a period of more than 50 years it continued to be prolific of large nuggets of native gold, weighing from one pound to 28 pounds. For a long period it was worked as a placer mine, though ultimately a vein was discovered, and worked to a depth of 90 feet, with satisfactory results.

About Salisbury are groups of mines. The Yadkin has acquired considerable reputation. The range from Salisbury to Greensboro', the McCulloch, Jack's Hill and Lindsay, make up a vein about one mile long. The former gave both gold and copper ore of a high grade. The Fisher Hill mine, five miles south of Greensboro', is reputed to have good ores. The Hodges Hill mine, in this vicinity, carries copper pyrites.

(TO BE CONTINUED.)

OREGON.

THE GRANT COUNTY GOLD MINES.—We take the following concerning the mines of this county from the *Bed-Rock Democrat* of February 27:

"The northeastern and eastern portions of this county are traversed by the Blue Mountains, and the central part is watered by the John Day River and its tributaries, and it is along these that the placer mines of the county are found. The most important district is the Canyon Creek, which environs Canyon City. This has proved very rich in the past, averaging from fifteen to twenty-five thousand dollars for the season, which lasts from April to October. The yield has been decreasing, however, for the last two or three years, and the mines are now owned by the Chinese, who take up or purchase such as the whites may vacate.

"The production of the district is estimated at about ten thousand dollars per year. The supply of water is sufficient for a large area, there being six ditches, having a length of fifty-one miles, and a capacity of four thousand inches.

"Dixie Creek, fifteen miles east of Canyon City, produces a fine gold. The mines extend for five miles, are worked by sluice washing, and employ two hundred and fifty persons, of whom two-thirds are Chinese.

"Elk Creek district, which lies thirty miles north of Canyon City, has been worked since the spring of 1864, and has yielded well. Several heavy nuggets have been found there, ranging in value from one hundred to over six hundred dollars. There are two ditches to supply the district with water; one is eleven miles long and cost nineteen thousand dollars; and the second is eight and one-quarter miles in length. The Middle Fork mine, in the district, is quite rich, and yields a flour gold. It has been worked since

1865, and has yielded an aggregate of about seventy thousand dollars. There are several good quartz lodes in this district.

"The Gem of the Mountains yielded $26 per ton by arrasta, and the National $20 per ton by the mill process. The former has a width of 22 inches at a depth of 27 feet. The Olive Creek mines, 60 miles from Canyon City, yield a fine gold worth from $14 to $17 per ounce, and employ during the season, which is very brief, extending only from May to August, about 120 persons, two-thirds of whom are whites and the remainder Chinese. Granite Creek and Burnt River districts are the other two mining camps in the county. There are several extensive quartz lodges in the county that prospect well, but remain undeveloped. The yield of gold in this county may be estimated at $350,000 per annum, and its total yield to this time at somewhat over $10,000,000. The annual yield of the State exceeds $3,000,000."

NOTES.

EXPLOSION OF POWDER MILLS IN MASSACHUSETTS.—BOSTON, March 12, 1878.—The northeastern portion of Middlesex County was startled to-day by the report of a terrific explosion, which was heard in Lowell, seventeen miles from the point at which it occurred. The shock came from the blowing up of two mills of the American Powder Company at South Acton, Mass. The company has been running on extra time to fill orders for the Turkish Government, the powder being shipped from New Haven. The two mills destroyed and completely shattered to pieces were the water press mill and mill No. 4. Both were new structures erected since the explosion of last year. Two workmen in the press mill were instantly killed, their bodies being thrown some three hundred yards from the mill. Several other of the employés were injured, but none seriously. The office of the company, situated some six hundred feet from the press mill, was demolished. This is the third time within nine months that these mills have exploded, and two of the former workmen left the work only a short time since, not daring to risk their lives longer. The loss is estimated at $200,000.

[In this connection we may call attention to General Oliver's improved method of manufacturing powder, which has been for a number of years in successful operation near Wilkes-Barre, Pa., and in which the risk of serious explosion is totally obviated and the cost of production at the same time diminished.—ED. E. AND M. J.]

FORFEITED PUBLIC LAND GRANTS.—WASHINGTON, March 8.—The Committee of the House on public lands has reported favorably a bill restoring to the public domain more than 125,000,000 of acres of public lands, granted to States and railroad companies, and to aid various public works, which lands have become forfeited by failure to comply with the terms of the grants. It is held that the forfeiture does not take effect without legislation. Most of the grants named were made to States to aid specified enterprises, and several of them date back as far as 1856. The following is the preamble and the text of the bill:

Whereas, More than 100,000,000 acres of the public lands of the United States have been granted by Congress to States and corporations to aid in the construction of certain railroad and telegraph lines, and said States and corporations have failed to perform the conditions of their respective grants, and have failed, in whole or in part, to earn said lands, many of which have been withdrawn and withheld from settlement for more than 20 years, and which lands should be restored to the public domain, and offered to settlement as other public lands; therefore,

Be it enacted, &c., That all the public lands which have been granted by Congress to aid in the construction of the following named railroad and telegraph lines, and specified, which have not been earned under said grants, are hereby declared forfeited to the United States, and said lands shall hereafter be disposed of as other public lands of the United States:

The following is the name of railroad, location, and estimated amount of lands granted which the bill declares forfeited:

Gulf & Ship Island Railroad, Mississippi, 652,800 acres; Alabama & Florida Railroad, Alabama and Florida, 419,520 acres; Coosa & Tennessee Railroad, Alabama, 132,480 acres; Mobile & Girard Railroad, Alabama, 840,880 acres; Coosa & Chattanooga Railroad, Alabama, 150,000 acres; Alabama & Chattanooga, formerly Northeast & Southwest Alabama, and Wills Valley Railroads, Alabama, 897,920 acres; Pensacola & Georgia Railroad, Florida, 1,568,729 acres; Florida, Atlantic & Gulf Central Railroad, Florida, 183,153 acres; North Louisiana & Texas, formerly Vicksburg, Shreveport & Texas Railroad, Louisiana, 610,880 acres; New Orleans, Baton Rouge & Vicksburg Railroad, Louisiana, 3,800 000 acres; St. Louis & Iron Mountain Railroad, Missouri, 640,000 acres; Little Rock & Fort Smith Railroad, Arkansas and Missouri, 1,00?,?96 acres; Detroit & Milwaukee Railroad, Michigan, 355,420 acres; Houghton & Ontonagon, formerly Marquette & Ontonagon Railroad, Michigan, 552,515 acres; North Wisconsin, formerly St. Croix & Lake Superior Railroad, and branch to Bayfield, Wisconsin, 1,408,455 acres; Wisconsin Central, formerly Portage, Winnebago & Superior Railroad, Wisconsin, 1,800,000 acres; St. Paul & Pacific, St. Vincent extension, formerly branch to Red River of the North, Minnesota, 2,000,000 acres; St. Paul & Pacific Railroad, Brainerd Branch, formerly branch to Lake Superior, Minnesota, 1,4?5,000 acres; Hastings & Dakota Railroad, Minnesota, 550,000 acres; Oregon Central Railroad, Oregon, 1,200,000 acres; Atlantic & Pacific Railroad, various, 42,000,000 acres; Texas Pacific Railroad, various, 18,000,000 acres; Northern Pacific Railroad, various, 47,000,000 acres. Total, 127,247,048 acres.

The bill is causing a good deal of excitement among railroad men, and will attract pretty wide attention, since it touches a very large number of interests.

Some of the lands enumerated are worthless; others are supposed to be very valuable. According to the public records the lands are all forfeited, and only this formal act is needed to restore them to the Government; but there is a supposition that in some cases the works have been completed as provided for, and the lands have not been filed for, because the moment they come into possession of the corporations they are subject to taxation, which is escaped by allowing them to remain as public lands. If such is the fact, the bill above noted will lead the roads to come forward with their claims and show their real condition. It will be noticed that Texas-Pacific and Northern Pacific lands are in the list, which is said to cover all technical forfeitures to date.

INDEX OF CURRENT TECHNICAL LITERATURE.

EXCHANGES.

[In this department will be given abstracts of the more important original articles contained in current technical periodicals at home and abroad.]

The following gentlemen have kindly consented to assist in making the reviews of current technical periodicals:

JOHN C. RANDOLPH, Mining Engineer, New York.
Prof. TROWBRIDGE, School of Mines, Columbia College, New York.
Prof. H. S. MONROE, " " " " "
Prof. T. EGLESTON, " " " " "
ARTHUR F. WENDT, Mining Engineer, New York.
MANSFIELD MERRIMAN, Yale Scientific School, New Haven, Conn.
FRANKLIN GUITERMAN, Mining Engineer, Cincinnati, Ohio.
Prof. P. deP. RICKETTS, Ph. D., School of Mines, New York.
Prof. E. A. FUERTES, Cornell University, Ithaca, New York.

REPERTORIUM FUR EXPERIMENTALPHYSIK, München, February, 1878.—*The Results of Magnetic Observations Made in Russia in the Summer of* 1876, by Iwan Smirnow. (The author appears to have traveled from village to village recording each day the declination and dip of the needle. The diurnal variation is usually only three or four minutes.)....*On a Method for Determining the Boiling Point*, by Drs. Handl and Pribram. (An apparatus by which the boiling point of a liquid is rendered independent of the atmospheric pressure.)....*New Declinometers*, by E. Schneider. (Improvements on the instruments at present used in the mines of Saxony.)....*On the Position of the Optical Axis of Elasticity in Gypsum*, by Prof. Lang. M. M.

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ANSWERS.

ASSAYS.

New York Office:

CXIV. L. H.—Gold, 11 oz.; silver, 3·5 oz. per ton.

CXVI. L. H., New York.—Iron pyrites marked E 19, yields: Gold, 2·95 oz.; silver, 0·4 oz. per 2,000 lb.

CXVII. L. H.—F. 4—Gold, ·04 oz.; silver, ·35 oz. per ton.

CIX. A. E. Goodrich, Chicago.—Sample of rock yields neither lead nor silver.

STATISTICS OF COAL PRODUCTION.

This is the only Report Published that gives full and accurate returns of the production of our Anthracite mines.

Comparative statement for the week ending March 9, and years from Jan. 1:

TONS OF 2,240 LB.	1878. Week.	1878. Year.	1877. Week.	1877. Year.
Wyoming Region.				
D. & H. Canal Co..	27,353	477,489	38,417	357,840
D. L. & W. RR. Co.	21,749	363,424	34,495	352,760
Penn. Coal Co.....	504	88,223	16,436	144,937
L. V. RR. Co.....	20,250	148,498	15,929	170,861
P. & N. Y. RR. Co..	1,797	3,535	1,265	8,410
C. RR. of N. J.....	5,847	135,252	44,918	211,469
	77,500	1,216,421	151,460	1,246,277
Lehigh Region.				
L. V. RR. Co.....	48,151	354,649	42,689	417,503
C. RR. of N. J.....	10,115	145,587	44,978	188,921
D. H. & W. B. RR..	.....	3,329	346	4,368
	58,266	503,565	88,013	610,792
Schuylkill Region.				
P. & R. RR. Co	125,395	512,050	67,408	666,589
Shamokin & Lykens Val....	10,572	70,271	10,326	68,896
	135,967	582,321	77,734	735,485
Sullivan Region.				
Sul. & Erie RR. Co.	1,028	6,662	124	2,178
Total.....	272,761	2,308,969	317,331	2,594,732
Increase.....	.....	.....	.....	.....
Decrease	44,570	285,763	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

Receipts and shipments of coal at Chicago Ill., for the week ending March 9, and year from Jan. 1.

	Week. Tons.	Year. Tons.
Receipts.....	16,901	182,833
Shipments.....	2,279	39,333
Perth Amboy business:		Tons.
Received for the week.....		6,457
Shipped for the week.....		7,943
On hand March 2		93,079

The Exports of Coal from Baltimore for the week ending March 8 were 207 tons, and since January 1, 10,221 tons, as against 4,605 tons for the corresponding time in 1876.

Belvidere Delaware Railroad Report for week ending March 9:

	Week.	Year. 1878.	Year. 1877.
Coal for shipment at Coal Port (Trenton).....	170	170	.....
Coal for shipment at South Amboy	7,483	109,548	95,931
Coal for distribution.....	3,670	30,729	31,344
Coal for Company's use.....	1,771	16,017	14,519

The Production of Bituminous Coal for the week ending March 9, was as follows:

Tons of 2,000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2,240 lb.....	9,226	106,630
Barclay Region, Pa.		
Barclay R. R., tons of 2,240 lbs.....	11,652	58,417
Broad Top Region, Pa.		
Huntingdon and Broad Top R. R.....	† . . .	22,467
*East Broad Top.....	1,204	11,225
Clearfield Region, Pa.		
*Snow Shoe.....	1,000	5,820
*Tyrone and Clearfield.....	24,180	144,496
Allegheny Region, Pa.		
*Pennsylvania R. R	3,826	27,086
Pittsburgh Region, Pa.		
*West Penn. R. R.....	4,548	10,04
*Southwest Penn. R. R.....	510	4,744
*Penn & Westmoreland gas coal, Pa. R. R.....	13,734	114,550
*Pennsylvania R. R.....	7,193	51,660

*For the week ending Feb. 21.
† This report was not received this week.

The Production of Coke for the week ending Feb. 21:

Tons of 2,000 lbs.	Week.	Year
West Penn R. R.....	1,438	8,210
Southwest Penn. R. R.....	13,305	103,636
Penn. & Westmoreland Region, Pa. R. R.	1,028	8,683
Pittsburg, Penn. R. R.....	1,049	11,101
Total...	16,820	131,630

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 15, 1878.

Anthracite.

We have but the same old story to relate. The demand for coal is extremely limited, with no indications of an active business at an early day. The Hudson River is open, as are also all the coast and most of the inland ports; and, although freights are very low yet business does not improve. The opening of the canals will probably increase the demand slightly, but the purchases will only be small and for sorting up.

The production of anthracite coal last week was 272,761 tons, as compared with 252,077 tons the previous week, and 317,331 tons the corresponding week of 1877. The total production since January 1 has been 2,308,969 tons, as compared with 2,594,732 tons for the like period of last year, showing a decrease this year of 285,763 tons. Considering the mild winter

we have passed through, and the higher prices that are ruling, the restriction of production will have to be very much greater than yet shown, to have an important influence on prices.

The stock of coal afloat is estimated by the best of authorities at 60,000 tons. The Delaware & Raritan Canal will open on Monday, and let out a little coal.

Bituminous.

There has been no important business done in this coal, nor is there likely to be for a month. It is not yet an official fact, but the indications are that the Pennsylvania Railroad will advance freights on Clearfield coal. It is very questionable, however, if it will not have to reduce them again before the season has advanced far, or adopt the very bad policy of giving secret concessions. The situation in the Cumberland region is unchanged. The miners who are working at 40c. per ton are able to supply the present demands, and by securing full employment are making from $2.25 to $3 per day of about 8 hours' work. There is a growing inclination on the part of the remaining miners to submit to the reduction in wages. This region is greatly overstocked with labor, and although the rate per ton received for mining last year was very liberal, yet the average total amount received for the year by miners was very small. For the latter they were largely to blame. They entered into strikes which for a long time stopped business entirely, and then, by demanding wages unreasonably high as compared with those paid in other districts, they limited the ability of the companies to compete with other coals. If the miners would consult their own interests they would submit to the moderate reduction in wages asked by the companies, and assist in bringing the Cumberland out-put up to where it has been in past years. Then the companies might have the ability to pay more liberal wages; while if this is reduced to a lower figure than last year, the companies, to cover expenses, will have to demand a reduction in wages greater than has yet been proposed.

Newcastle coal is being offered in Boston at $3.50 per ton, and we notice elsewhere in our columns a demand for a still further reduction in wages at the English coal mines. There is no use ignoring the fact that there is no possibility of materially advancing the prices of our soft coals; on the contrary, everything points to the necessity for reducing the cost of mining and transportation to market.

Since writing the above we have received the Cumberland *News* of yesterday, which contains the following:

"Yesterday evening Superintendent Brackett, of the Maryland Company, was waited upon by a number of his company's miners, who proposed to go to work at the offered price of 40 cents. The men said that they have been idle long enough and were willing to go to work, and the company could go on and make contracts and depend upon their services.

"Mr. Brackett informed the men that he could not at once put them to work, but that he would communicate with the management of the company in New York and await instructions."

New York.

Wholesale Prices of Anthracite Coal f. o. b. at Tide Water Shipping Ports, per ton of 2,240 lbs.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
WYOMING COAL.						
Lackawana, at Weehawken	$3 25	$3 25	$3 25	$3 25	$3 75	$3 50
*Pittston, at Weehawken	3 25	3 25	3 25	3 35	3 75	3 50
Wilkesbarre, at Port Johnson	3 25	3 25	3 25	3 35	3 75	3 25
Lehigh Valley Coal Co., at Amboy	.....	3 50	3 25	3 35	3 75	.....
Plymouth R. A., at Port Johnston	.....	.....	3 25	3 45	3 85	3 35
LEHIGH COAL.						
Old Company's, at Port Johnston	3 75	.....	3 40	3 50	3 75	3 25
Honey Brook Lehigh, at Port Johnston	3 75	.....	3 40	3 50	3 75	3 25
Lehigh Valley Coal Co., at P. Amboy	3 75	.....	3 50	3 50	3 75	3 25
Mount Pleasant, at Hoboken	3 50	.....	3 50	3 50	3 75	3 00
Hazelton, at Hoboken	3 50	.....	3 50	3 50	3 75	3 00
Cross Creek, at Port Johnston	3 50	3 40	3 40	3 50	3 75	3 25
SCHUYLKILL COAL *at Pt Johnston, Phila.*						
Hard White Ash	3 25	3 25	3 25	3 25	3 50	3 00
Free-burning W. Ash	.....	3 25	3 25	3 25	3 50	3 00
Schuylkill Red Ash	.....	.....	.....	3 50	3 50	3 00
Lorberry	.....	.....	3 60	3 60	3 60	3 00
Lykens Valley Vein	.....	.....	3 75	3 75	3 75	3 25

* Forty cents per ton additional for delivery in New York.

Wholesale Prices of Bituminous Coal.

DOMESTIC GAS COALS.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Pennsylvania—		
At Greenwich, Philadelphia	$4 70	$5 50
At S. Amboy	5 00	5 50
Kanawha at Richmond	4 10	5 40
Red Bank Cannel, Pa., at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt	4 50	5 65
Despard, West Va	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburg Orrel. Md. " "	4 50	6 00
Cannelton Cannel, West Va	.....	10 00
" Splint " at Richmond	4 00	7 00
" Gas Coal at Richmond	4 00	5 65
Peytona Cannel, W. Va., at Richmond	....	10 00

MANUFACTURING AND STEAM COALS.

Cumberland at Georgetown and Alexandria	2 85@3 10	4 35@4 50
Cumberland, at Baltimore	3 10@2 25	4 35@4 50
Cl'rfi'd "Eureka" and "Franklin."		
At mines	0 75	....
At Baltimore	3 25	4 50
At Philadelphia	3 25	4 50

FOREIGN GAS COALS.

	Sterling.	Am. cur'ncy.
Newcastle, at Newcastle-on Tyne	8s.6d.	@10s.6d. $6 00 @ $6 00
Liv. House Orrel, at Liv.	25s.	13 00
Ince Hall Cannell "	35s.6d.	18 00
" Gas Cannel "	25s.6d.	10 00@ 10 50
Scotch Gas Cannel, at Glasgow, nominal	25s.	7 50
	Gold.	
Bl'k House, at Cow Bay, N.S.	$1 75	$4 50
Caledonia, at Pt. Caledonia	1 50	4 25
Glace Bay at Glace Bay	1 60	4 25
Lingan, at Lingan Bay	1 75	....
Intern'l Mines, at Sydney	1 75	4 50
Pictou, Vale Mines, at Pictou	2 00	4 70

Retail Prices.

Per ton of 2,000 lb.

Anthracite.

	G. & Egg.	Stove.	Chest.
Pittston coal delivered	$5 00	$5 00	$5 00
Lack. coal, delivered below 59th St.	4 50	4 50	4 50
Wilkes-Barre, delivered above Canal Street	4 50	4 75	4 50
Wilkes-Barre, deliv'd below Canal Street	4 25	4 50	4 25
Lehigh and Locust Mountain, delivered above Canal Street	5 00	5 00	4 75
Lehigh and Locust Mountain, delivered below Canal Street	4 50	4 75	4 50

Bituminous.

Liv. House Orrel	$18 00	American Orrel	$11 00
Liv. House Cannel	18 00	Red Bank Cannel	7 00
Am. "	11 00	Cumberland	9 00
Ca'n'lt'n Bl'k, or splint.	10 00		

Baltimore. March 11, 1878.

Specially reported.

Wholesale Prices per ton of 2,240 lb.

In cars at Depot N. C. R. R.

HARD WHITE ASH, FREE-BURNING WHITE ASH, SHAMOKIN, ETC.

Lump and Steamboat	$4 15	Stove	$4 50
Broken	4 20	Chestnut	4 00
Egg	4 30		

LYKENS VALLEY RED ASH.

Broken, Egg and Stove	$4 55	Chestnut	$4 15

From yard or wharf to dealers, 75c. per ton additional for all kinds and sizes.

Buffalo, N.Y. March 12, 1878.

[Specially reported by C. M. UNDERHILL.]

The Delaware, Lackawanna & Western Railroad Co. will sell their Scranton coal, the Delaware & Hudson Canal Co. will sell their Lackawanna coal, and J. Langdon & Co. will sell their Henry Clay and Mount Carmel Black Diamond coals, at the following prices per ton of 2,000 lb. for Buffalo local trade for the present:

	To DEALERS.		To CONSUMERS.	
	On car or boat.	In yard, screened.	Delivered at yard.	Retail.
Grate	$4 20	$4 30	$5 45	
Egg	4 20	4 30	5 45	
Stove	4 45	4 55	5 70	
Chestnut	4 35	4 45	5 60	
Blossburg	3 85	4 35	5 00	

[Specially reported by LEE & LOOMIS.]

Per ton of 2,000 lb. delivered on cars.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville coke	$4 75	.....	.....	.....
Brookfield Coal	3 80	.....	.....	.....
Briar Hill	3 65	.....	2 85	.....
" "	3 25	.....	.....	.....
Youghiogheny	4 00	.....	.....	.....
Monterey	.....	.....	.....	.....
Catfish	3 10	2 70	.....	.....
Stoneboro	.....	.....	2 50	1 80
Sterling Cannel	4 50	.....	.....	.....
Cameron	.....	3 00	.....	.....
Hillside	.....	.....	.....	1 80

Boston. March 9, 1878.

The market is dull, and we reduce our quotations. The decline is mainly owing to the extremely low freight rates now ruling—85c. from New York and $1.10 from Philadelphia. We quote the imported Newcastle coal below, from which it will be seen that it is lower than any other on the list. Three steamers have arrived from Newcastle this week—the Egbert, with 1,400 tons, Darrow, Mann & Co.; Cohanim, 1,311 tons, Charles A. Campbell; Laurestina, 1,800 tons, Darrow, Mann & Co.

We quote Boston wholesale prices as follows:

Anthracite, broken	$4 15	Caledonia	$4 50
" egg	4 25	Newcastle	4 25
" stove	4 75	Cannel, English	18 00
Franklin	5 75	" Library	15 00
Cumberland	4 50	" Buckeye	11 00
Clearfield	4 50	Penn	6 25
Westmoreland	6 25	Youghiogheny	6 25

[*Commercial Herald.*

Cincinnati, O. March 5, 1878.

[Specially reported by the Consolidated Coal & Mining Co.]

Per bushel of 72 lbs.

	Retail delivered.	Wholesale afloat.
Youghioghney	11c.	7½c.
Camden	9c.	5½c.
Cannel	17@18c.	13c.

Anthracite, delivered, $7@$8 per ton of 2,000 lbs.

Chicago, Ill. March 12, 1878.

[Specially reported by Messrs. RENO & LITTLE.]

Retail prices of coal delivered per ton of 2,000 lb.

Lakawanna Stove	$6 75	Erie and Brier Hill	$5 50
" Chestnut	6 75	Wilm'gton & Ill.	$3 50@4 00
" Grate	6 75	Blossburg	6 50
" Egg	6 50	Piedmont	7 50

Cleveland, O. March 12, 1878.

[Specially reported by F. A. BATES, Esq.]

Per ton of 2,000 lb. f.o.b. vessels.

WHOLESALE.

Brier Hill (Church Hill)	$3 30
" " No. 2 Grades	3 10
Straitsville Lower Vein	2 75
Hocking Valley	2 75
Massillion (No. 2 grades 15 cents less)	2 75
Tuscarawas Valley	2 30
Columbiana	2 30
Nut coal, various grades	$1 90@2 20
Screenings " "	1 35@1 75
Youghiogheny gas coals	3 75

RETAIL TRADE.

	1 to 10 tons Tons.	Upw'd
Brier Hill lump	$4 60	3 75
Massillon and Mineral Ridge lump	3 75	3 50
" " " " nut	3 50	3 25
Straitsville Lower Vein and Hocking lump	3 60	3 35
" " " nut	3 40	3 15
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 00	2 75
" nut	2 50	2 35
Lacka'a., Wilkes-Barre and Pittston egg and grate	6 10	5 85
Lackawanna, Wilkes-Barre and Pittston stove	6 25	6 00
" " chestnut	6 25	6 00

Lehigh $1 per ton higher.

All sales to be strictly cash with order or C.O.D.

Hamilton, Ont. March 12, 1878.

[Specially reported by H. BARNARD.]

Retail prices delivered per ton of 2,000 lb.

Scr. or Wilkes-B. Grate	$5 00	Lehigh Lump	$6 00
" " Egg	5 00	Brier Hill	5 50
" " Stove	5 25	Massillon	4 50
" " Nut	5 25	Smithing	5 50

Indianapolis, Ind. March 12, 1877.

[Specially reported by Messrs. COBB & BRANHAM.]

WHOLESALE BITUMINOUS.

On board cars, per ton of 2,000 lb.

White River	$2 65	Hocking Valley	4 25
Brazil Block	2 60	Raymond City	4 60
Highland, grate	2 25	Youghiogheny	4 60
Indiana Cannel	4 60	Blossburg (smithing)	6 10
Peytona	5 75	Piedmont "	6 10

Per car, 12 tons.

Block coal, nut	$18 00	Block Slack	$17 00
Highland, "	18 00		

RETAIL BITUMINOUS.

Delivered per bushel of 70 lb.

White River	13c.	Block Nut, steam use	8c.
Brazil Block	13	" Slack, "	7
Highland Grate	11	Virginia Cannel	25
Block Nut, domestic use	11	Youghiogheny	18
Highland Nut, " "	11	Blossburg	26
" " steam	8		

GAS COKE.

Per bushel, measure containing 2,888 cubic inches.

Retail, crushed	14c.	Wholesale	9c.
" lump	12		

ANTHRACITE.

Per ton of 2,000 lb.

Wholesale on Cars.		*Retail delivered.*	
Wilkes-Barre, all sizes	$5 75	Wilkes-Barre, all sizes	$7 50
Lackawanna, "	6 25	Lackawanna, "	7 00
Lehigh "	6 75	Lehigh, "	7 00

Louisville, Ky. March 12, 1878.

[Specially reported by Messrs. BYRNES & SPEED.]

Wholesale per bushel of 72 lb.

Pittsburg	8c.	Raymond City	7½c.
Ashland (Ky.)	7	Kentucky, on cars	8

Retail.

Pittsburg	$3 00	Anthracite, per ton	$7 50
Raymond City	2 75	City Made Coke, per bsh	7c.
Ashland (Ky.)	2 50	Soft Coke, per bushel	7c.
Pittsburg nut	2 50		

New Orleans, La. March 7, 1878.

[Specially reported by Messrs. C. A. MILTENBERGER & Co.]

PITTSBURG COAL.

At wholesale (by boat-load)	32½@35c. per bbl. of 180 lb.
To steamboats	50c. " "
" manufactories	50c. " "
" families	60c. " "
In hhds. (for shipment)	$6.00 per hhd. from 5 to 6 bbls.

ANTHRACITE COAL

Per ton of 2,000 lb.

At wholesale	$7 00 to $8 00
To families, etc	9 00 to 10 00

ST. BERNARD (KY.) COAL.

To steamboats.....40c. per bbl. of 180 lb.
" families.....50c. " "
Virginia cannel to families.....$1.00 " "

Milwaukee, Wis. March 12, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

Retail price per ton of 2,000 lb.

Anthracite, Egg, Chestnut and Stove			$6 50
Lehigh lump	$7 00	Connellsville coke on	
Brier Hill	5 25	RR. track	7 25
		Straitsville	4 80

Montreal. March 12, 1878.

[Specially reported by Messrs. ROBERT C. ADAMS & Co.]

Wholesale per 2,240 lb.

Scotch Steam	$4 75	Cape Breton Steam	$4 25
Pictou	4 50	Newcastle Smith's	6 00

Anthracite at retail, per 2,000 lb. delivered.

Stove	$6 50	Chestnut	$6 00
Egg	6 00		

Philadelphia, Pa., March 14, 1878.

[Specially reported.]

We have now reached the middle of March, a time corresponding in former years to making contracts and preparations for starting the collieries at full rate, and the combination has not accomplished what should have been its main object, viz., giving a chance to a market overstocked under the stimulus of very low prices to be depleted sufficiently for creating a healthy and steady demand for coal. There is still an overstock at all points, and there is no doubt that the quantity produced so far this winter has been greater than it would have been if no attempt at curtailment had been made at all.

Curtailment by quotas seems to be a failure. It is particularly so at a season of the year when there is always a natural curtailment in the production. During the week ending 9th inst. the Reading Railroad passed over their main line 104,000 tons of coal to 56,000 tons for the corresponding week of last year, when the weather was cold and the trade quite active. The railroad has carried, since December 1 last to 9th inst., 40,000 tons more than during the corresponding period of the previous fiscal year.

The elements constituting the Board of Control are the same extra sanguine elements whose expectations and preparations for the last few years have always been so much beyond the real wants of the market that they have nearly ruined everybody engaged in the anthracite coal trade, including themselves. The Board disregards entirely the condition of the trade. They theorize and act on what they expect it to be or wish it to be, ignoring what it is, and the consequence is that we have reached the most critical time of the year without imparting the least confidence to buyers. The only remedy to cure all this—if this attempt to regulate the production is to meet with the least success—is to stop absolutely when the market is full and coal not wanted, until the excess is disposed of and coal wanted again, and to repeat this as often as necessary, not forgetting that a stoppage of ten days during the shipping season, accomplishes more than a stoppage of one month during the winter. It is astonishing how few weeks it would take, if properly selected, to rid the market of the excess which is causing all the mischief. But a stoppage must be an earnest thing, no work whatever but pumping and repairs which cannot be delayed. So far, the whole thing, including circulars at advanced prices, has been a farce.

Freights continue very low, but a little stiffer than last week. Many vessels are tied up, owners waiting for better rates. The least demand would improve them. They are lower than ever before at this season of the year, and are the surest indication of the dullness of the trade.

Pittston, Pa. March 12, 1878.

Pennsylvania Coal Company's Coal in Yard.

Retail per ton of 2,000 lb.

Lump, Egg, and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, 50 cents per ton additional.

Richmond, Va. March 12, 1878.

[Specially reported by S. H. HAWES, Dealer in Coal.]

Per ton of 2,240 lb. f.o.b.

Kanawha Cannel	$9 00	New River Bituminous	$3 70
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston	5 70	Norwood Gas and	
Kanawha Gas Coal	4 90	Steam Coal	2 70

St. Louis, Mo. March 12, 1878.

[Reported by JAMES J. SYLVESTER, Secretary of the Anthracite Coal Association.]

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.

	Per ton.		Per ton.
Lackawanna	$8 00@8 50	Schuylkill	$8 00@8 50
Wilkes-Barre	8 00@8 50	Lehigh	9 00@9 50

BITUMINOUS.

Blossburg	$9 00	Big Muddy	$3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connells. Coke	6 50

Sandusky, Ohio. March 12, 1878.

[Specially reported by C. E. BLACK, Agent Con. Coal and Mining Company.]

We quote coal on cars at Sandusky, as follows:

Per ton of 2,000 lb.

ANTHRACITE.

	Grate.	Egg.	Stove.	Chest.
Lehigh	$6 50	$6 50	$6 50	$6 50
Wilkes-Barre	5 75	5 75	5 75	5 75
Lackawanna	5 75	5 75	5 75	5 75

BITUMINOUS.

Massillon	$3 00	Straitsville	$2 70
Del Carbo	2 75	Shawnee	2 70
Hocking Valley	2 70	Blossburg	4 75

Prices retailed delivered 50c.@75c. above car prices.

Toledo, Ohio. March 5, 1878.

[Specially reported by Messrs. GOSLINE & BARBOUR.]

Ton of 2,000 lb.

Straitsville lump	$2 65	Massillon lump	2 85
" nut	2 20	" nut	2 40
Shawnee lump	2 65	Willow Bank lump	2 85
" nut	2 20	" nut	2 40
Hocking Valley lump	2 65	Cumberland	5 40
" nut	2 20	Blossburg	5 40

Prices of hard coals on cars at Toledo are as follows:

Ton of 2,000 lb.

	Grate.	Egg.	Chestnut.	Stove
Pittston	$5 70	$5 70	$5 85	$5 95
Wilkes-Barre	5 70	5 70	5 85	5 95
Lackawanna	5 70	5 70	5 85	5 95
Lehigh	5 75	6 15	6 30	6 40

For retail delivery in city the prices are as follows: Stove and chestnut $6.45; grate and egg, $6.20 per ton; Lehigh 60c. per ton additional.

Prices soft coal f.o.b. vessel for Lake shipments will be from 15 to 20c. per ton more than prices on cars.

OFFICE OF THE PA. & N. Y. R. R. Co.,
Bethlehem, Feb. 1, 1878.

On and after this date the rate on coal for Buffalo, Watkins Ithaca and Weedsport, for water shipment; Auburn, for New York Central Railroad; Sterling, for Lake Ontario Shore Railroad, and Fair Haven, will be $1 per gross ton, between Coxton and Waverly. On coal for Rochester, via Erie R. W., Salamanca and points west thereof, an additional charge of 10 cents per ton will be made to cover transhipment charges at Waverly. The full rate from Coxton to Buffalo is $2.75, to Rochester $2.47. Local rates of August 6 will go into effect the same date.

ROBERT H. SAYRE, President.

Freights.

Per ton of 2,240 lb.

Representing the latest actual charters to March 14, 1878.

PORTS.	From Philadelphia.	From Baltimore.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me			
Albany			
Alexandria, Va	70		
Brooklyn, N. Y			
Bangor, Me			
Bath, Me		$1 40	90
Baltimore	55@65		
Boston, Mass	$1 00@$1 25	1 40	80@90
Bridgeport, Conn.		1 30	50
Bristol, R. I			80
Beverly, Mass			80@90
Cambridge, Mass.			80@90
Charleston, S. C.			
Danversport, Mas			
East Cambridge, Mass			
Fredericksbrg, Va			
Fall River		1 30	70
Gloucester			
Georgetown, D.C.			
Hartford, Conn			
Hoboken	1 50		35
Hudson, N. Y			
Jersey City			35
Lynn, Mass			
Marblehead, Mass			
Middletown			90
Medford, Mass			
Nantucket, Mass.			90
New Bedford		1 35	80
Newburyport		1 55	1 00
New Haven		1 30	50
New London			50
Newport			70
New York	75	1 25	35
New Orleans, La.			
Norfolk, Va			
Norwich			65
Norwalk, Conn			55
Philadelphia			
Portland	1 00	1 40	80
Portsmouth, N.H.	1 25	1 55	90
Providence		1 30	70
Quincy P'nt, Mass			
Rockport			
Richmond, Va			
Saco			
Salem, Mass		1 40	80@90
Saybrook, Mass			
Savannah, Ga			
Somerset, Mass			75
St. John, N.B			
Wareham			
Washington	60@90		
Wilmington, N.C.			
Wilmington, Del.			

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 15, 1878.

American Pig.—The Thomas Iron Company report a further sale of 4,000 tons of pipe iron. Outside of this we learn of no business. The market is in a very demoralized condition; cash buyers having very much their own way with certain brands of iron, the makers of which appear to have pressing financial necessities. We quote No. 1 foundry at $18@$19; No. 2, $17@$18, and forge $16@17.

Scotch Pig.—In this there is only a retail business doing. We quote as follows: Eglinton, $23@23.50; Coltness, $26@26.50; Glengarnock, $25@25.50.

According to Messrs. John E. Swan & Bros., of Glasgow, under date of March 1, the number of furnaces in blast in Scotland was 85, as against 119 a year ago; the quantity (which is steadily increasing) of pig iron in store was 170,416 tons; the shipments from Dec. 25 show a decrease as compared with the like period of 1876-7 of 3,062 tons, and the imports of Middlesbrough iron 4,786 tons.

Rails.—We are reported sales of about 14,000 tons of steel on the basis of about $43 here, for such as were for eastern delivery. We quote steel rails at eastern mills at $41@42, and at western mills, $43@45; iron rails, $33@36.

Old Rails.—There is nothing doing in these. Prices are weak. We quote at $18@19.

Wrought Scrap.—Without business, we quote nominally at $21.50@22.

Baltimore, Md. March 11, 1878.

[Specially reported by Messrs. R. C. HOFFMAN & Co.]

The iron market remains quiet. Stocks on hand light, and prices firm at about quotations, viz.:

Balt. Char.	$29 00@$30 00	M. & White	$14 00@$15 00
Va. "	28 00@ 30 00	C'l'C.B.Blooms	50 00@ 55 00
Anth. No. 1	19 00@ 20 00	" " Billetts	55 00@ 60 00
" " 2	18 00@ 19 00	Refi'd Blooms	45 00@ 50 00
" " 3	17 00@ 18 00		

Buffalo. March 14, 1878.

[Specially reported by Messrs. PALEN & BURNS.]

We quote iron to-day as follows per gross ton, cash, on cars here. The American Scotch iron we quote is made from pure Black Band ores, and is equal to imported iron everyway. If your readers who use this quality could see our iron and use it they would forever abandon the foreign article.

No. 1 Foundry	$20 50
B 1 "	20 00
No. 2 "	19 50
Silver Gray	19 00
American Scotch A 1	20 50
" " B 1	19 50
" " No. 2	19 00

Chattanooga, Tenn. March 11, 1878.

[Specially reported by J. F. JAMES, dealer in iron & metals.

The market remains dull and unchanged with no signs of any improvement.

Tenn., Ala. & Ga. Charcoal, No. 1 Foundry			$18 00@$19 00
Tenn., Ala. & Ga. Charcoal, No. 2 Foundry			17 00@ 18 00
Tenn., Ala. & Ga. Charcoal, Gray Forge			15 00@ 16 00
Tenn., Ala. & Ga. Coke, No. 1 Foundry			19 00@ 20 00
Tenn., Ala. & Ga. Coke, No. 2 Foundry			17 00@ 18 00
Tenn., Ala. & Ga. Coke, Gray Forge			15 00@ 16 00
Tenn., Ala, & Ga. cld B. (car-wheel)			20 00@ 28 00
Charcoal or Coke, white and mottled			14 00@ 15 00
Old rails	$18 00@$19 00	Wr'ght scrap, No. 2	$12 00
Old car wh'ls.	16 00@ 17 00	Cast scrap	10 00
Wr'ght scrap, No. 1	17 00	Muck bar	32 00@ 33 00

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines	$1 25
Brown Hematite (about 55 per cent. metallic iron)	1 75

Cincinnati, O. March 12, 1878.

[Specially reported by Messrs. TRABER & AUBERY, Commission Merchants for the sale of pig iron, blooms, ore, etc.]

Below please find closing quotations of our pig iron market, viz.:

CHARCOAL.

H'n'g Rock No. 1 Foundry & B 1	$22 00@$22 50	—4 mos.
" No. 2 "	20 00@ 21 00	—4 mos.
" Soft Silver Gray	19 00@ 20 00	—4 mos.
" Mill	18 00@ 19 00	—4 mos.
Tennessee No. 1 Foundry	21 00	—4 mos.
" No. 2 "	20 00	—4 mos.
" Mill	18 00@ 19 00	—4 mos.

STONE COAL.

Ohio No. 1 Foundry	$20 00	—4 mos.
" No. 2 "	19 00	—4 mos.
" Nos. 3 and 4 "	18 00@ 17 00	—4 mos.
" Mill	17 00@ 18 00	—4 mos.

COKE.

Ohio & W. Va. No. 1 Foundry	$20 00	—4 mos.
" " No. 2 "	19 00	—4 mos.
" " Mill	17 00@ 18 00	—4 mos.

CAR-WHEEL.

H'n'g R., C. B { Hecla, Vesuvius, Etna, Jefferson.	$36 00	—4 mos.
Maryland, " Cedar Point	37 00	—4 mos.
Missouri, " Maramec	30 00	—4 mos.
Alabama, " Woodstock	32 00	—4 mos.

BLOOMS.

Charcoal	$45 00@$50 00—cash.

SCRAP IRON.

Cast	40c. @ 45c.—cash.
Wrought	62½c.@ $1.00—cash

Columbus, Ohio. March 13, 1878.

[Specially reported by Messrs. KING, GILBERT & WARNER, dealers in Pig Iron and Ores.]

There is a slightly better feeling manifested in the pig iron market since last report, but as yet no advance in prices. The usual time, four months, allowed on quotations.

FOUNDRY IRONS.

No. 1 Hanging Rock Charcoal	$23 50@$24 00
No. 2 " " "	22 00@ 22 50
No. 1 Hocking Valley soft and strong from pure limestone ores	21 50@ 22 00
No. 2 Hocking Valley soft and strong from pure limestone ores	20 50@ 21 00
No. 1 American Scotch	20 50@ 21 00
No. 1 Moxahala	21 50@ 22 00
No. 2 "	20 50@ 21 00
No. 1 Shawnee	20 50@ 21 0
No. 1 Eliza (Jackson County)	20 50@ 21 00
Silver Gray	18 00@ 19 00

MILL IRONS.

Gray neutral	18 50@ 19 00
Mottled and white neutral	17 50@ 18 00
Gray cold short	17 50@ 18 00
Mottled and white cold short	16 50@ 17 00

Cleveland, O. March 12, 1878.

[Specially reported by Messrs. C. E. BINGHAM & Co.]

Per gross ton, on four months' time. Subject to change without notice.

FOUNDRY IRON.

No. 1 L. S. Charcoal	$24 00	Am. S., No. 1, Ch. Val.	$22 00
No. 2 " "	24 00	" " B—1, " "	21 00
No. 1 Anthracite	21 00	" " No. 2 " "	19 00
No. 2 "	19 00	No. 1, Massillon	22 00
No. 1 Bituminous	21 00	B—1, "	21 00
No. 2 "	19 00	No. 2, "	20 00

CAR-WHEEL AND MALLEABLE IRON.

No. 3, L. S. Charcoal	$25 00	Nos. 5 & 6, L. S. Char.	$25 00
No 4, " "	25 00		

BESSEMER IRON.

Nos. 1 & 2, L. S. Char. $24 00

FORGE IRON.

No. 1, Gray	$18 00	White and Mottled	$17 00

Louisville, Ky. March 12, 1878.

[Specially reported by Messrs. GEORGE H. HULL & Co.]

Market dull, and prices have a downward tendency, buyers purchasing for immediate wants only. The usual time, four months, allowed on quotations below.

FOUNDRY IRONS.

	No. 1.	No. 2.
Hanging Rock Charcoal	$21 50@$22 50	$19 00@$20 00
Southern Charcoal	19 00@ 20 00	18 50@ 19 50
H'n'g Rock, Ste'l & Coke	20 00@ 21 00	18 00@ 19 00
Southern Stonecoal & Coke	18 50@ 19 50	17 50@ 18 50
"American Scotch"		20 00@ 22 00
Silver Gray		17 00@ 18 00

MILL IRONS.

No. 1 Charcoal, Cold-short & Neutral	$17 00@$18 00
No. 1 Ste'l & Coke, Cold-short & Neutral	16 50@ 17 50
No. 2 Ste'l & Coke, Cold-short & Neutral	16 00@ 17 00
No. 1 Missouri and Indiana, Red-short	20 00@ 22 00
White & Mottled, Cold-short & Neutral	14 00@ 16 00

CAR-WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold Blast	$34 00@$37 00
Alabama and Georgia, Cold Blast	24 00@ 33 00
Kentucky, Cold Blast	25 00@ 33 00

Milwaukee, Wis. March 11, 1878.

[Specially reported by Messrs. R. P. ELMORE & Co.]

CHARCOAL IRON.

No. 1 Lake Superior per gross ton	$23 00—4 mos.
" 2 " " " "	22 00—4 mos.

ANTHRACITE IRON.

No. 1 Anthracite per gross ton	24 00—4 mos.
" 2 " " "	23 00—4 mos.

STONE COAL AND COKE.

Warner's Am Se'th (Bk. Band, per ton	$25 00@ —4 mos.
Soft Silvery per ton	22 00@23 00—4 mos.
Ohio Stone Coal	22 00@23 00—4 mos.

CAR WHEEL.

Lake Superior ores per ton	$25 00@27 00—4 mos

Pittsburg, Pa. March 12, 1878.

[Specially reported by A. H. CHILDS.]

The market continues quiet, and without any improvement in the volume of business. Offerings are in excess of the wants of the trade, and while there has been no further decline in price, there is upon the whole less firmness than before the first of the year.

	4 mos.		4 mos.
No. 1 F'dry	$20 00@$21 50	M. & White	$16 00@$17 00
No. 2 "	19 00@ 20 00	Hot Blast Ch.	20 00@ 25 00
Gray Forge	17 50@ 20 00	Cold Blast W.	@ 35 00

Philadelphia, Pa., March 14, 1878.

[Specially reported by JUSTICE COX, JR., & CO., Iron Merchants, 333 Walnut street, Philadelphia.]

Pig Iron.—The market for pig the past week has been dull and unsatisfactory in the extreme. The firm feeling reported last week, brought about by the large contracts for pipe—hence inquiry for iron—has given place to dullness, and a market far from strong. In one case, at least, the iron for the contract, for cast pipe, was on hand. Hence no new purchases were necessary, and a contract for 7,000 tons did not go to furnaces, as hoped for. There is a little more desire to sell than was manifested for some time, only, however, for prompt delivery. The future is too uncertain, for both producer and consumer. We report sales of about 1,500 tons, and quote No. 1 $18.50 to $20, No. 2 $17 to $18, Gray Forge $16 to $18, all at Philadelphia.

Manufactured Iron.—In bars nothing new is reported, and mills in this neighborhood, with one or two exceptions, are dull, and few orders are offering. Yet prices are firm, as all have found competition in prices does not bring business. The Shope Mill have about all they can do. In plate and tank, one or two mills report all they can do, while most mills are dull, and only running from day to day. In skelp nothing new is reported. We quote bars, best refined, 2c.; common from 1.65 to 1.9; plate and tank 2⅞ to 6c.; skelp 2 1-10 to 2 2-10c. ℔ lb.

Steel Rails.—The makers of steel rails continue to have about all the business they want. Prices remain firm. Buyers for large lots generally get favorable terms. We quote $41.50 to $43 at mills.

Iron Rails.—The demand for iron rails is only in small lots, but keeping most mills moderately busy. We quote $33 to $35 at mills.

Old Rails.—The market for old rails cannot be reported quite as brisk as some weeks past, and prices are slightly weaker. Quite a number of sales are making, however, but offers are not reported as they were last month. We report sales of 250 tons, and quote $20 to $21.

Scrap.—Wrought is dull of sale, and quoted $20 to $24, cast quoted $12 to $16; muck bars quoted $33 to $35, as to quality.

Richmond, Va. March 12, 1878.

[Specially reported by ASA SNYDER, Esq.]

This market is firm at quotations for wheel iron, also for old rails. The demand for foundry grades of pig iron has fallen off in the last few days.

Quote freights to New York $1.75; to Philadelphia, $1.50.

Amer. Scotch Pig Iron			$23@$24
Anthracite	"	No. 1	20@ 21
"	"	No. 2	19@ 20
"	"	No. 3	18@ 19
"	"	Mottled	16@....
Coke	"	No. 1	22@....
"	"	No. 2	21@....
Virginia Cold Blast Charcoal Pig Iron, cold short			20@ 24
" " " " "		neutral	28@ 29
" Warm " " " "		cold short	19@ 22
" " " " "		red short	
		silver grey	18@ 19
Old Rails			18@ 19
Wrought scrap No. 1			20@....
Cast scrap —— Machinery			18@....
Richmond Refined Bar Iron			2@2¼c
Horse-shoes			$4 50@4 75
Mule-shoes			5 75@ ....
Old Dominion nails (standard size)			2 60 keg.

METALS.

NEW YORK, Friday Evening, March 15, 1878.

The dealers and producers of metals have received no encouragement this week, the market upon the whole having been fully as quiet as for many preceding weeks.

Receipts of Metals at New York for the week ending March 14, 1878:

Copper, bbls	137	Quicksilver, flasks	100
Copper, cakes	354	Spelter, pieces	1,100
Lead, pigs	10,987		

Gold Coin.—The price of gold has ranged from 101¼ to 100¾, and closes at 101¼.

Bullion.—The silver market is quiet and firm, having been down to 54¼d. in London and recovering to ¾ yesterday. The present quotations are: London, 54⅜d.; New York, 118½ per oz.; and San Francisco, 8½ per cent. discount.

DATE.	London Pence.	N. Y. Cents.	DATE.	London Pence.	N. Y. Cents.
Mar. 9	54 3-16	118¼	Mar. 13	54¼	118¼
Mar. 11	54¼	118¼	Mar. 14	54⅜	118½
Mar. 12	54¼	118¾	Mar. 15	54⅜	118½

The Treasury Department has made a purchase of silver bullion during the past few days at very advantageous prices. For prudential reasons the department decides not to make public the price paid. It is understood, however, that it was considerably lower than the amount asked by the bonanza silver ring.

Silver Bullion Certificates.—WASHINGTON, March 15.—The Committee on Banking and Currency this morning agreed upon a bill providing for the issuing of silver bullion certificates. The bullion is to be counted at its equivalent in coin, less Mint charges and cost of transportation. The certificates are to be issued by any silver coining Mint or Assay Office, and to be redeemable at the Assay Office in New York and the Mint in San Francisco. The certificates are to be a legal tender in payment for all Government dues.

Should this proposed bill ever become law it would prove the very worst form of the "silver madness." The United States would soon be the owner of countless millions of bullion, and unless it went into the business of bullion brokerage, would in time hold all the surplus silver in the world, that is, as long as its certificates would circulate. Of course this would hasten the exodus of gold, and we would soon see our last gold dollar leave for Europe.

Large Silver Purchase in London.—LONDON, March 15.—The financial article of this morning's *Daily Telegraph* says that yesterday's rise in the price of silver was in consequence of the purchase of seven hundred and fifty thousand dollars for shipment to America.

The Branch Mint Mania.—WASHINGTON, March 13.—A sub-committee of the Committee on Coinage held a session this morning to consider the question of the establishment of additional branch mints, and heard arguments from Representatives Sayler, of Ohio, in favor of Cincinnati; Springer, of Illinois, in favor of Springfield, Ill.; Franklin, of Missouri, in favor of Kansas City; Steele, of North Carolina, in favor of Charlotte, and Mr. Morris, of Illinois, in favor of Quincy, Ill.

OMAHA, Neb., March 10.—A Board of Trade mass-meeting is called for to-morrow evening to present to Congress Omaha's claims for the establishment of a branch mint here. Nearly two-thirds the silver product of the country, representing $60,000,000 in value, besides over 3,000 cars of base bullion were handled here last year. The aggregate business of Omaha smelting works last year was about $5,000,000. Every effort will be made to secure a branch mint.

The Commercial Effect of the New Dollar.—The *Evening Post* of the 14th inst. says:

"The most important commercial fact connected with the new dollar is that it contains 412½ grains of silver, and that the gold value of this will hereafter be the par of all coin obligations of the Government, and the unit of value by which property in this country will be measured so soon as there is a full supply of these coins. For a time, or until there is such supply, we expect to see these coins rule at only a slight discount from the gold dollar, and this because they can be used in place of gold dollars for the payment of duties at the Custom House. When the demand for this purpose is fully supplied, then the market value of the coins will begin to fall to their bullion value, and in due time they will rule at that value the same as gold dollars now do. This may take four months, or even a year, but the time will come as certainly as the months roll around. Within a year silver may have advanced to 59@60d. per ounce, or may have fallen to 50d. per ounce. Whatever the price of the metal in London, it will regulate our measure of values in this country. If specie payments are not resumed, and it is almost certain that they will not be, or if attempted that the effort will fail, we shall then have, unless silver becomes perfectly steady, not only a dollar whose value will vary with the London silver market, but hundreds of millions of paper, payable in these variable dollars, which paper promises will fluctuate from time to time according as the prospects of their payment vary. Since suspension, at the beginning of the war, we have had variations only at one end, so to speak, of the currency; now, assuming that silver does not become steady, both ends will vary from day to day, the promise to pay and the thing with which the promise is payable."

It is generally anticipated that the earliest general use for the new silver dollars will be to pay duties, while gold will be used to settle our foreign obligations. The *Journal of Commerce* says no decided advance in the gold premium can be looked for until the shipping point is reached in sterling exchange.

FORM OF THE SILVER CERTIFICATES.—The Washington *Post* says that the silver certificates, as approved for engraving and issue, do not contain the word "coin." Their form will be as follows:

Silver Certificate. Act of Feb. 28, 1878. Silver Certificate.

CERTIFICATE OF DEPOSIT. *No.* —

This certifies that

there have been deposited with

THE ASSISTANT TREASURER OF THE U. S.

At .....

payable at this office to the bearer, on demand,

T E N

SILVER DOLLARS.

Countersigned: *JOHN ALLISON,*

Register of the Treasury.

For Assistant Treasurer, U. S.:

No.— *JAS. GILFILLAN,*

Treasurer of the United States.

The Opportunity for Counterfeiters on the Silver Dollar.—The Boston *Commercial Bulletin* says: "It is reported at the Secret Service Bureau that leading counterfeiters are making their arrangements so that they will be able to supply *fac-similes* of the new silver dollar within a few days after the Philadelphia Mint begins operations. The counterfeiters can afford to make silver dollars of equal weight and fineness with the genuine. There would then be a profit of eight or nine cents on each, which would pay well for coining, were there no risks of detection. The counterfeit would be, intrinsically, just as valuable as the genuine—an odd thing, to be sure, and only possible when government debases its own coin to the counterfeiter's standard."

Copper.—There is reported more inquiry, although it is only in a small way. It is estimated that the sales in small lots aggregated for the week fully 200,000 lb., at 17⅛@17¼c. Large lots could probably be purchased at 17c. The latest cable information quoted: Best selected at £71 10s. in London, and Chili bars, £65.

Tin.—The London market is unchanged. The business here is only a small jobbing one, and prices for large lots are weaker. We quote Straits and L. & F. at 14¼@14⅜c. There is no Refined in the market.

Tin Plates.—These are very quiet and unchanged in price. We quote, in gold, per box, as follows: Charcoal tins, $5.87½@$6.12½, and ternes, $5.70; coke tins, $5.25@$5.37½, and ternes, $5.37½.

Messrs. Robert Crooks & Co., of Liverpool, under date of February 28, say of tin and terne plates: "We are again able to reduce a few of our quotations, and we find other makers willing sellers, though they decline reducing their prices, except for positive offers. There is no life whatever in the market, and fair charcoal tins are procurable at from 18s. 3d. to 18s. 6d. for half cross specification. Ternes quoted 7s. 6d. to 19s. Coke tins and ternes procurable at about same as last week."

Lead.—Sales of about 200 tons at $3.75@$3.80 have been made during the week. The market is for the moment higher, being quoted at about $3.85. The cause of this is not on the surface. There is still a large stock of lead held in numerous hands, and although undoubtedly there must come a better demand for the article than prevails now, yet there is nothing to indicate that the production will be less than the consumption. In fact, the indications are that the production this year, like that of 1877, will be greatly in excess of the requirements.

The shipments of pig lead from England to China for the first two months of this year were 1,410 tons, as compared with 2,640 tons last year, and to Japan 572 tons, as against 31 tons for January and February, 1877.

The Pig Lead Combination.—A number of estimable gentlemen who reside at or near St. Louis seem to imagine as we have several times had occasion to report in these columns, that, by a stroke of the pen, they can regulate the price of lead for the whole United States. They have held meetings and agreed among themselves that the present price of lead is outrageous, and that there is no valid reason why—if they would all say so together—they should not make consumers and dealers everywhere actually believe that lead is not so abundant as they thought it was, and persuade them to pay more for it.

We have before us a circular issued by these gentlemen on March 9, in which they state that they have formed themselves into an "*American Pig-Lead Association*," and they ask all dealers or producers of lead to join the same and pay for this privilege twenty-five dollars each.

The members who sign the articles of association bind themselves—under the penalty of being turned out of the A. P. L. Association—to sell no lead at a less price than that fixed by the Executive Committee of said association.

Provided, That the lowest cash price for first-class corroding lead shall not be less than four cents per pound in New York and that less freight to New York and other points. Other than first-class corroding lead to be 15 cents per hundred pounds less than this. The committee to fix prices on 15th of each month for the succeeding month and to notify each member of the A. P. L. A.

Provided, That this agreement shall be signed by all producers in the United States who produce annually as much as one hundred tons of lead, and by all persons now holding as much as one hundred tons of lead otherwise than as manufacturers or consumers.

Each member is to consider a notice from the Committee that this agreement has been sufficiently signed as sufficient, and thereafter he is to do no business below the official rate—or if he does, the Executive Committee will "investigate" him, and expel him from the association.

Any member may withdraw on giving thirty days' notice.

This movement—which is a very faint imitation of the Anthracite Coal Combination—will never pass beyond the stage of a meeting "resolution." The fact is apparent to all outside of St. Louis who have studied the question, that the limit to the decline in lead will only be found when we find foreign market for our surplus, and no amount of combination can advance prices here till that has been secured. The gentlemen who have "resolved" so many things according to this circular, had better resolve to secure greater economy in production and transportation, and carry into effect the only sensible resolution passed at the meeting referred to, viz.: "to investigate the question of immediate exportation of the lead to China and elsewhere." We have reason to believe that some of the largest Missouri works can produce lead at 1¾ cents per pound, and are expecting to make further economy. This of course does not leave profit to the works, but it is sufficient to show that even when the export figure (from 3¼ to 3½c.) is reached, Missouri can still maintain its own in the struggle for the prize.

The rapidly increasing production of argentiferous bullion in Utah, Colorado and Nevada, where the ore is treated for its silver alone, and where the silver is made to pay, in part or altogether, the freight on the lead to St. Louis, and even to New York, is an element in the lead market which cannot be controlled by any combination, and which has to be met in a more practical form than a set of resolutions decreeing on paper a minimum price for lead.

This, indeed, seems to us to be the very key to the lead question, and it is pure folly to ignore or belittle it.

Spelter and Zinc.—Domestic spelter is quiet and quoted at 5.35@5¼c. Sheet zinc is dull and quoted at 6¼c.

Antimony.—This article is scarce, particularly Hallett's, and is quoted at 12¾@13c., gold.

Salt Lake Ore and Metal Market.

SALT LAKE CITY, Utah, March 15, 1878.

Argentiferous Lead (Base Bullion), $31 per ton for lead; $1.15 per ounce for silver; $20 per ounce for gold. The quotations for silver are based upon the silver in the lead of 80 to 120 ounces per ton of 2,000 lb.

The *Inter-Ocean's* correspondent, under date of March 4, says: "The bullion market is still inactive and prices are entirely nominal. The shipments of ore and bullion for the week ending March 2 are as follows: Twenty-seven cars bullion to Pittsburg, eight cars bullion to New York, thirty cars bullion to Omaha, ten cars bullion to Newark, ten cars lead ore to Hilliard, one car copper ore to Boston, two cars copper ore to Phœnixville, Pa.

	Pounds.
Bullion	1,589,477
Lead ore	207,840
Copper ore	60,336
Total	1,857,653

"The roads in the mountains are still in a wretched condition."

A dispatch dated Salt Lake, Utah, March 12, says: "Out of the twenty-five smelting furnaces in Salt Lake, only four are in operation, on account of the low price of lead and high freights, being unable to compete with low freights from the Missouri."

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, March 15, 1878.

The coal stocks have participated in a general movement at the Stock Exchange to make things lively on the basis of inflation to be derived from the passage of the Silver bill. The advance in the prices of these stocks must have been upon some such argument, for there is none that could be used in relation to the coal trade itself that could have such an effect. The sales of Delaware & Hudson Canal have aggregated 5,555 shares at 47@48⅝, closing at 47¾. Delaware, Lackawanna & Western has had liberal dealings at 46⅝@48⅝, closing at 47½. New Jersey Central Railroad, with sales of 3,681 shares has had a weak inclination, the range being from 15½ to 14⅜, closing at 15.

Monongahela Valley Railroad.—A company by this nam has been organized in West Virginia, to build a railroad from the Pennsylvania line through Monongahela and Marion counties to Fairmont or Palatine. The capital stock is fixed at $500,000, and the office of the company is at Fairmont, W. Va. The line is part of a projected extension of the Waynesburg and Washington road from Waynesburg, Pa., southward.

Central Railroad of New Jersey.—The Committee of Detail has given notice that all parties interested in the stock or bonds of this company, the bonds of the American Dock & Improvement Company, or of the Lehigh & Wilkes-Barre Coal Company, are invited to call and sign the agreement for the equitable adjustment of its affairs. To participate in the benefits of the agreement, stockholders must sign it on or before March 25.

A dispatch from Easton, Pa., says this company yesterday issued orders to reduce the force of men employed at the Phillipsburg (N. J.) repair shops to one carpenter, one machinist and one blacksmith. This order throws out of employment about 150 men. The order is only expected to last until the resumption of the running of coal trains.

North Chicago Rolling Mill Company.—A special meeting of the stockholders of the North Chicago Rolling Mill Company will be held in Chicago April 4, for the purpose of ratifying the arrangements entered into for largely increasing the manufacturing capacity of this company by purchase or lease of other works.

Lehigh & Wilkes-Barre Coal Co.—A special meeting of the stockholders of this company will be held May 15, for the purpose of holding an election for or against an increase of the indebtedness of said company by the issue of income bonds of the company.

Miscellaneous Stocks and Quotations.

Sales and quotations of the stocks and bonds dealt in here, at Philadelphia and Baltimore for the week ending the 15th inst are given in the following tables. The Philadelphia quotations will have a * affixed. The Baltimore quotations are indicated thus †.

STOCKS.	Par Value.	High'st	Lowest	Closing	Sales: Shares.
American Coal Co.	$25	.....	.....	32	.....
St.L.,I.M.& S.R.Co..	100	5¼	5⅛	5	800
Spring Mt. Coal Co.	50	.....	.....	35	.....
*Cambria Iron Co..	50	.....	.....	53	.....
*Penn. Salt Mf'g Co.	50	.....	.....	64	9
*Westm'land C. Co.	50	.....	.....	70	100
*Buck Mt. Coal Co..	50	.....	.....	30	.....
*Schuyl. Nav. Co...	50	.....	.....	.....	.....
†Balt.& O.RR.Co.pf	100	95	93½	95	238
" " " com	100	89⅛	87½	.....	46
†George's C'k C. Co	100	.....	.....	90	.....
†S. Clara M'g Co...	100	.....	.....	25c.	.....
†Atlantic Coal Co.	10	.....	.....	1.00	.....

BONDS.	Prine'l. When Due.	Int'est. When Due.	Hig'st.	Lowest	Amount.
D., L. & W., 7s, conv	1892	J. & D.	.....	.....	.....
" " " " 2d mtge.	1881	M. & S.	.....	.....	.....
N.J.C.,1stmtge.new	1890	F. & A.	111½	110¾	$46,000
" " " 1st mtge.,con	1899	Q.	64¾	64½	23,000
" " " convt.....	1902	M. & N.	64½	63⅝	8,000
Lehigh & W. B., con	1899	Q.	35½	34¾	52,000
Am. Dock & Imp. 7s	.....	J. & J.	43¾	.....	11,000
St.L.I.M.& S..1st mt	1892	F. & A.	105	.....	1,000
Ches. & O., 1st mtge	1899	M. & N.	.....	.....	.....
D & H C Co.,1stm.rg	1884	J. & J.	94½	93¾	39,000
" " " " "	1891	J. & J.	96	.....	3,000
" " " " m.loan cp	1894	A. & O.	95½	95½	2,000
" " " " " rg.	1894	A. & O.	95½	95	22,000
" " " " new mge.	.....	.....	.....	.....	.....
*L.V.R.,1stm.6s.cp.	1898	J. & D.	.....	.....	.....
" " " " rg.	1898	J. & D.	111½	.....	1,000
" " " 2d m. 7s,rg.	1910	M. & S.	113	112¼	10,000
" " " con.m.6s,rg	1823	J. & D.	98	97¾	3,000
" " " " 6s cp.	1923	J. & D.	97½	.....	6,000
*Pa.RR.,1st m.6s,cp	1880	J. & J.	104¾	.....	14,000
" " " g. m., 6s, cp.	1910	J. & J.	106¾	.....	3,000
" " " " 6s, rg.	1910	A. & O.	108¾	108½	16,000
" " con.m.6s,rg.	1905	Q.	.....	.....	.....
" " " 6s, cp.	1905	J. & D.	.....	.....	.....
" " new loan, 5s	.....	.....	110¾	.....	13,000
*P.& R. R., 1st m.6s, R. C. 43-44.....	1880	J. & J.	.....	.....	.....
P. & R. R., 1st m. 6s, R. C. 48-49.....	1880	J. & J	103½	.....	2,000
P.& R. R.,2d m.7s cp	1893	A. & O.	.....	.....	.....
" " " scrip....	1882	J. & J.	.....	.....	.....
" " " in.m.7s,cp	1896	J. & D.	.....	.....	.....
" " " c.m.7s,cp.	1911	J. & D.	101⅜	100¾	6,000
" " " 7s. rg.	1911	J. & D.	101½	101	6,000
" " " cvt.7s,R.C	1893	J. & J.	48¼	.....	2,100
" " C.& I.Co.,Deb 7s, R. C.....	1892	M. & S.	43	.....	1,000
P. & R.C.& I. Co., m. 7s, R. C.....	'92-3	various	.....	.....	.....
L. Nav. Co.,6s,rg.m.	1884	J. & Q.	103	100½	1,756
" " RR., rg. m.	1897	F. & Q.	102	.....	4,200
" " cvt. co. G. R.	1894	M. & S.	98	.....	1,000
" " "Gold R. C.	1897	J. & D.	87	.....	1,500
" " con.m.7s,rg.	1911	J. & D.	.....	.....	.....
*P.& N.Y.C.,7s,R.C.	1896 / 1906	J. & D.	113¾	.....	,000
*Pa. Canal, 6s. cp..	1910	J. & J.	.....	.....	.....
*Schuyl.Nav.,1st m. 6s. rg.....	1897	M. & Q.	.....	.....	.....
*Sus. Coal, 6s, rg...	1911	J. & J.	.....	.....	.....
†Balt.&O. RR., 6s..	1880	J. & J.	101½	.....	2,000
" " " " 6s..	1885	A. & O.	.....	.....	.....

Total transactions for the week.....$303,056

Philadelphia Stocks.

PHILADELPHIA, Friday Evening, March 15, 1878.

Quotations of the Philadelphia coal shares exhibit a slight improvement. The sales for the week amount to about 86,000 shares. Pennsylvania Railroad stock has ranged from 27 to 28 and closes at the latter figure; the sales for the week amount to 52,177 shares. Reading stock has changed hands to the extent of 33,482 shares, with no special feature observable in the range of prices. Lehigh Valley and Lehigh Coal & Navigation stocks have been comparatively quiet, with quotations at the close firmly maintained.

PHILADELPHIA, March 12, 1878.

Pennsylvania Railroad.—The annual meeting of the stockholders of the Pennsylvania Railroad was held at ten o'clock this morning in Musical Fund Hall, and, as expected, was largely attended, notwithstanding the bad weather. Many prominent citizens were present. The Mayor of the city, W. S. Stokley, presided. There was considerable discussion at the beginning as to whether the report (which has already been published) should be read, and it was decided in the affirmative.

During the reading many questions were asked in explanation of certain matters, which were generally answered by Colonel Scott. He said his salary was $24.000 a year since the reduction. Before that he got $30,000. The vice-presidents got $10,000 and $12,000. The other officers of the company have salaries from $10,000 to $2,000, and the Assistant President $4,800.

When that part of the annual report was read concerning the purchase of the Empire Transportation Line, quite a number of questions were asked Colonel Scott. He thought it was a profitable investment, and he was confident, from the earnings of the Transportation Company, that the entire purchase money could be paid off in four years, whereas eight or ten years are allowed to do so. The old Empire Company, he said, made lots of money, and he believed the Pennsylvania Company would also make money out of it. Several years ago the company could not have been purchased advantageously, but last fall it had been done to great advantage.

A resolution introduced in the annual report, giving the company power to create a trust to fund its debt, was taken up and discussed at very great length.

Mr. Porter, a stockholder, objected to the proposed funding measure, because two stockholders and a trust company would have the purchase and guardianship of $183,000,000 of securities. Mr. Mintzer Smith offered an amendment providing that 6 per cent. dividends should be first set apart before the money shall be taken out of the net earnings of the company.

Mr. Steinmetz moved that the annual report be referred to a committee of stockholders, with instructions to make inquiry in regard to the several items of the report, and more especially that touching the proposition "to create a trust for the purchase of certain securities," and report the result of said inquiries to an adjourned meeting of stockholders to be held in the same place on Tuesday, the 26th inst., at 10 P. M.

Colonel Scott suggested that the Chair appoint a committee of seven, and that the meeting be held next Monday week, instead of next Tuesday week. He hoped the committee would consider the entire report thoroughly, and make a full report at that time.

Mr. Steinmetz accepted the suggestions of Colonel Scott, and the amendment was adopted.

Mr. McCook, of New York, representing many shareholders of New York, offered a resolution providing that the Chair should appoint a committee of seven stockholders to confer with the present directors, and recommend a ticket for directors to be voted for at the next annual meeting. This was agreed to almost unanimously.

A resolution of thanks to the Mayor of Philadelphia, for his efforts in preventing riot and loss to the company's premises in this city, last summer, was unanimously adopted.

A resolution, offered by Mr. Sutton, will be referred to the committee of seven, when appointed by the Mayor. It provides that no free passes shall be issued, no free freight carried, and no favoritism in transportation shown. It also urges that the expenses of the road should be reduced, consistently with safety, and that the number of officers be reduced.

There are not a few who look upon the proposition "to create a trust for the purchase of certain securities," as simply a move of the ring to unload their donated stocks on the Pennsylvania R. R. Co., while that corporation is able to pay for them. The purchase of the Empire Transportation Co. is looked upon in the same light. In other words, the impression prevails that the rats are preparing to leave the ship, and are unloading on the stockholders. It would have been interesting to know how much the salaries of Col. Scott and the Vice-Presidents amount to, in the aggregate, for each, bearing in mind that these gentlemen are all presidents, vice-presidents, or hold salaried offices of some kind, in other corporations. Many of the stockholders would like to know what percentage—whether less than five or as much as ten—of Col. Scott's time the stockholders of the Pennsylvania R. R. Co. get for their $24,000 a year. It is certain that, for a long time past, we have heard more of Col. Scott as a lobbyist in the interest of the Texas Pacific R. R. than of his services to the stockholders of the Pennsylvania R. R. Co.

The bridge of this road over the Raritan River, at New Brunswick, N. J., was burned on the 9th inst. Work was almost immediately begun at building a new bridge, which was completed on the 14th inst. The first train crossed the new bridge at 2:25 in the afternoon. The celerity of this construction, in but five days after the disaster happened, is worthy of commendation. Trains are now running between this city and Philadelphia as usual.

Royal Land Company.—The proposed terminus of this company's railroad (formerly the Potomac, Fredericksburg & Piedmont) has been Harrisonburg, Va., but surveys are to be made for an extension from that place westward to Rawley Springs, about 11 miles. This extension will open a large tract of coal lands, where there is said to be an abundance of coal of good quality. The company's road is now in operation from Fredericksburg, Va., westward 38 miles to Orange Court House.

Lehigh Coal & Navigation Company.—The adjourned an

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

COAL STOCKS.

NAME AND LOCATION OF COMPANY.		Feet on Vein.	Capital Stock.	SHARES. No.	Par Val.	ASSESSMENTS. Total levi'd to date.	Date and amount per share of last. Mo.	Yr.	Amt.	DIVIDENDS. Total paid to date.	Last Dividend. Mo.	Yr.	Amt.	Rate per Ann.	HIGHEST AND LOWEST PRICES PER SHARE IN CURRENCY AT WHICH SALES WERE MADE. N. B.—Quotations of D., L. & W. R. R., and Pa. Coal Co. are per $100—two shares. Mar. 9. H.	L.	Mar. 11. H.	L.	Mar. 12. H.	L.	Mar. 13. H.	L.	Mar. 14. H.	L.	Mar. 15. H.	L.	SALES.
			$		$					$				Per c'nt														
Consol. Coal	Md.		10,250,000	102,500	$100	*					Jan.	1877	2½															
Del. & H. Canal	Pa.		20,000,000	200,000	100	*				38,821,104	Aug.	1876	4	9	48½	47	47¼	47	48½	47⅛	48⅜	47¾	47½	47⅜	47¾	47¾	47¾	5,555
Del., Lac. & W. R. R.	Pa.		26,200,000	524,000	250	*					July	1876	2½	5	47⅝	46¾	47	46⅝	48⅜	46⅞	48⅜	47⅛	47¾	47⅜	48½	47½	76,746
Lehigh C. & Nav.	Pa.		10,448,550	208,971	50	*					Nov.	1876	1½	5½	16⅞	16½			17	16⅞	17⅜	17⅛	17⅛	17⅛	17	18	17⅛	1,619
Lehigh Valley R. R.	Pa.		27,042,900	540,858	50	*									38½	38⅜	38½	38¼			38⅝	38⅝	38⅜	38¾	38¾	39	38¾	326
Maryland Coal	Md.		4,400,000	44,000	100	*					Jan.	1876	1½	1½														
N. J. Central R. R.	Pa.		20,600,000	206,000	100	*					Apr.	1876	2½	2½	15½	14¾	15	14½	15⅜	14⅞	15½	15¼	14⅞	14⅝	15	14⅜	3,681
Pennsylvania Coal	Pa.		5,000,000	100,000	50	*					Feb.	1878	3															
Pennsylvania R. R.	Pa.		68,870,200	1,337,404	50	*					May.	1877	1½	8	27½	27½	27⅜	27	27⅝	27⅛	27¾	27⅜	28¼	27⅝	28	27¼	52,172
Phil. & Read. R. R.	Pa.		34,278,175	685,563	50	*				43,012,497	Jan.	1876	2½+	10	13⅜	12⅞	13½	13	13⅜	13⅛	13¾	13½	13⅜	12¾	13	12⅞	33,487

GENERAL MINING STOCKS.

Dividend Paying Mines.

American	Col.		1,000,000	100,000	10	*				40,000	Mar.	1878	$0 10	12			9½		10½	9⅝	10½		11¼	10½	11	10½	2,330
Belcher, g. s.	Nev.	1,040	10,400,000	104,000	100	1,176,400	Dec.	1877	1 00	15,397,200	Apr.	1876	1 00	12													
Bobtail, g.	Col.	2,500	1,136,630	227,326	5	*				50,831	Nov.	1877	25														
Bobtail Tunnel, g.	Col.		100,000	20,000	5	52,000	July	1873	0 30	40,000	Dec.	1877	50	20													
California, g. s.	Nev.	600	54,000,000	540,000	100					24,840,000	Mar.	1878	2 00	24			31½				35	33	33½				135
Calumet & Hecla, c.	Mch		2,000,000	80,000	25	1,000,000				12,650,000	Feb.	1878	5 00	20													
Central, c.	Mch		500,000	20,000	25	100,000	June	1862	0 65	1,260,000	Feb.	1878	5 00														
Chollar Potosi, g. s.	Nev.	1,400	2,800,000	28,000	100	1,578,000	Jan.	1878	3 00	3,080,000	Feb.	1872	1 00														
Copper Falls, c.	Mch		1,000,000	20,000	50	535,000	May.	1876		100,000	Nov.	1871	1 00														
Cons. Virginia, g. s.	Nev.	710	54,000,000	540,000	100	474,600	June	1873	3 00	38,880,000	Mar.	1878	2 00	24	23¼						24		24¼	22½			35
Confidence, g. s.	Nev.	130	2,496,000	24,960	100	243,840	Mar.	1873	1 00	78,000	May.	1865	8½	8½													
Cons. Her. & Roe.	Col.	16,500	1,000,000	100,000	10	*				120,000																	
Crown Point, g. s.	Nev.	600	10,000,000	100,000	100	1,673,370	Jan.	1878	1 00	11,588,000	Jan.	1875	2 00	24													
Eureka Cons., g. s. L.	Nev.		5,000,000	50,000	100	100,000	May	1876	1 00	1,600,000	Feb.	1878	3 00	24													
Eureka G. Mg., g.	Cal.	1,680	2,000,000	20,000	100					2,134,000	Aug.	1877	2 00														
Franklin, c.	Mch		500,000	20,000	25	360,000	June	1876	5 00	585,000	Nov.	1871	1 00														
Gould & Curry, g. s.	Nev.	612	10,800,000	108,000	100	2,558,000	Dec.	1877	1 00	3,826,800	Oct.	1870	10 00														
Grand Prize	Nev.									1,200,000	Feb.	1878	1 00														
Hale & Norcross, g. s.	Nev.	400	11,200,000	112,000	100	2,746,000	Dec.	1877	1 00	1,598,000	Apr.	1871	5 00	12													
Hukill, g. s.	Col.	3,288	1,000,000	100,000	10	*				140,000	Mar.	1878	0 10	12	4.65		4.65				4.55		4.65				340
Kentuck, g. s.	Nev.	95	3,000,000	30,000	100	270,000	Dec.	1874	1 00	1,252,000	Mar.	1870	5 00														
Leopard, L. g. s.	Nev.	1,500	5,000,000	50,000	100	125,000	Feb.	1878	50	162,500	Dec.	1876	0 50														
Merrimac, s.	Mas.	1,500	500,000	100,000	5	*				110,000	Jan.	1878	0 10	12													
Minesota, c.	Mch.		1,000,000	20,000	50	436,000	June	1869	1 00	1,820,000	Mar.	1876	0 50														
Moose	Col.	39,000	2,000,000	20,000	10	*				200,000	Mar.	1878	0 25	10	8¾	8⅞	8½				8½		8⅞		8¾	8½	3,600
National, c.	Mch.		500,000	20,000	25	195,000	Oct.	1875	1 00	360,000	Oct.	1873	1 00														
N. Y. & Colorado, g.	Col.		1,000,000	50,000	20	*				20,000	Mar.	1877	0 20		2½	2.45	2.55	2.45	2.45	2.40	2.40		2¼	2.15	2.15	2.10	1,700
Northern Belle, s.	Nev.	1,600	5,000,000	50,000	100					1,425,000	Feb.	1878	1 00														
Ontario.	Utah	3,000	10,000,000	100,000	100					1,100,000	Mar.	1878	0 50	6	35						34¾		35		34		245
Ophir, g. s.	Nev.	675	10,080,000	100,800	100	3,035,200	Jan.	1878	1 00	1,394,400	Mar.	1864	4 00														
Pewabic, c.	Mich.		500,000	20,000	25	185,000	June	1868	3 00	460,000	July	1873	1 00														
Phœnix, c.	Mich.		1,000,000	20,000	50	817,500	Sept.	1870	3 00	20,000	Jan.	1876	1 00														
Plumas	Cal.		1,000,000	100,000	10					6,000	Mar.	1878	06				3¼	3	3.20	3.10	3.30	3.20	3.35	3¼	3.40	3.35	13,900
Polar Star, g. s.	Col.	1,300	500,000	50,000	10	*				5,000	Jan.	1878	0 10														
Quincy, c.	Mch.		200,000	20,000	10					2,130,000	Feb.	1877	4 00														
Raymond & Ely, g. s.	Nev.	5,000	3,000,000	30,000	100	540,000	Dec.	1876	1 00	3,075,000	Sept.	1873	3 00														
Ridge, c.	Mch.		500,000	20,000	25	200,000				90,000	Feb.	1875	1 00														
Rye Patch	Nev.	3,000				97,500	Nov.	1876	0 50	150,000	Dec.	1877	0 25														
St. Joseph, L.	Mo.	2,000 acs.	1,000,000	100,000	10					250,000																	
Savage, g. s.	Nev.	800	11,200,000	112,000	100	3,650,500	Jan.	1878	1 00	4,460,000	June	1869	3 00														
Seaton, g. s.	Col.	1,700	500,000	50,000	10	*				10,000	May	1877	0 10	12	2.40	2.30											200
Sierra Nevada, g. s.	Nev.	3,650	10,000,000	100,000	100	1,000,000	Jan.	1878	0 50	102,000	Jan.	1871	1 00	10													
Silver King										200,000	Feb.	1878	0 50														
Standard	Cal.									300,000	Feb.	1878	1 00														
Yellow Jacket, g. s.	Nev.	1,200	12,000,000	120,000	100	3,438,000	Jan.	1878	2 00	2,184,000	Aug.	1871	2 50														

Non-Dividend Mines.

Allouez, c.	Mch.		1,000,000	20,000	50	940,000	May	1876	5 00																			
Alpha, g. s.	Nev.	300	3,000,000	3,000	100	210,000	Aug.	1877	1 00																			
Am. Flag, g.	Col.	5,300	600,000	60,000	10	*											23c	22c	22c	21c			20c	19c	20c	18c	7,200
Bertha & Edith. g.	Vir.	645 acs.	3,500,000	350,000	10	*									15c		16c	14c	16c	15c	18c	15c	15c	14c	15c	13c	46,700
Best & Belcher, g. s.	Nev.	545	10,080,000	100,800	100	337,792	Aug.	1877	1 00																			
Bullion, g. s.	Nev.	943½	10,000,000	100,000	100	2,802,000	Jan.	1878	1 00																			
Caledonia, g. s.	Nev.	2,188	10,000,000	100,000	100	1,435,000	Oct.	1877	0 75																			
Cleveland, g.	Col.	3,715	250,000	25,000	10	*																						
Cons. Imperial, g. s.	Nev.	488	50,000,000	500,000	100	575,000	Oct.	1877	0 20																			
Con. N. Slope & E. C.T.	Col.	15,000	500,000	10,000	50	*																						
Dana, c.	Mch.		500,000	20,000	25	68,000	Jan.	1863	0 50																			
Dawson, s.	Ont.		1,200,000	60,000	20																							
Duncan, s.	Ont.		1,200,000	60,000	20	75,000	July	1876	41⅜																			
Exchequer, g. s.	Nev.	400	10,000,000	100,000	100	380,000	Jan.	1878	1 00																			
Granville, g.	N. C.	9,000	1,000,000	100,000	10	*			0 50																			
Humboldt, c.	Mch.		500,000	20,000	25	100,000	Sept	1876	0 15																			
International, s.	Ont.		1,200,000	60,000	20																							
Julia, g. s.	Nev.	3,000	11,000,000	110,000	100	525,000	Jan.	1878	0 75																			
Justice, g. s.	Nev.	2,100	10,500,000	105,000	100	2,237,500	Jan.	1878	2 00																			
Kings Mountain, g.	N. C.		1,200,000	120,000	10	*									2.05	2											100
Lacrosse	Col.	3,900	1,000,000	100,000	10	*									73c	70c	72c	67c	71c	67c	71c	68c	70c	65c	67c	62c	68,050
Lucerne	Col.	4,200	5,000,000	500,000	10	*																						
Madison, c.	Mch.		500,000	20,000	25	123,000	Sept	1876	0 10																			
Mariposa preferred	Cal.	44,387	5,000,000	50,000	100	1,425,000	June	1877	1 00																			
" common	Cal.	acres.	10,000,000	100,000	100	1,425,000	June	1877	1 00																			
Memphis	Col.	6,000	300,000	60,000	5	*																						
Mesnard, c.	Mch.		500,000	20,000	25	160,000	Apr.	1876	0 50																			
Mexican, g. s.	Nev.	600	10,080,000	100,800	100	181,440	Aug.	1877	0 30																			
Overman, g. s.	Mch.		1,000,000	40,000	25	3,053,880	Feb.	1878	3 00																			
Osceola, c.	Nev.	1,200	3,840,000	38,400	100	2,567,880	Nov.	1877	3 00																			
Petherick, c.	Mch.		500,000	20,000	25	165,533	Mar.	1876	0 50																			
Pleasant View, g.	Col.	1,200	200,000	20,000	10	*																						
Quicksilver preferred	Cal.	8,500	4,291,300			*																	30				100
" common	Cal.	acres.	5,708,700	100,000	100																17¾						100
Rockland, c.	Mch		500,000	20,000	25	495,000	Jan.	1874	1 00																			
Seg. Belcher, g. s.	Nev.	160	340,000	8,400	100	244,800	Apr.	1876	5 00																			
Silver City, g. s.	Nev.	3,900	6,310,000	63,100	100	15,775	Nov.	1875	0 25																			
Silver Hill, g. s.	Nev.	5,400	5,400,000	54,000	100	192,600	Dec.	1877	1 00																			
Star, c.	Mch.		500,000	20,000	25	265,000	Mar.	1876	0 50																			
Superior, c.	Mch.		500,000	20,000	25	340,000	Mar.	1874	0 25																			
Union Cons. g. s.	Nev.	850	10,000,000	100,000	100	285,000	Oct.	1877	0 25																			

g. Gold. s. Silver. L. Lead. c. Copper. * Non-Assessable.

Total Assessment levied to date..... 50,928,210 | Total Sales of Coal Stocks for the week..... 173,586 shares.
Total Mining Dividends to date..... 220,058,832 | Total Sales of Mining Shares for the week..... 135,635 "

† ▲ dividend of 3½ per cent. was declared on the preferred stock of this Co. in July.

nual meeting of the stockholders of this company was held on the 12th inst. for the purpose of considering the annual report, which the meeting of stockholders refused to accept two weeks ago. The following resolutions were adopted:

Resolved, That the results of the last year's operations, in view of the state of the coal trade, are sufficiently favorable to justify owners of a property of such great intrinsic value and exceptional advantages awaiting with confidence the developments of the future.

Resolved, That the terms of settlement with the Central Railroad of New Jersey and Lackawanna & Bloomsburg Railroad Company meet with the entire approval of the meeting, and that the thanks of the stockholders are hereby tendered to the officers for the able and intelligent manner in which the important and delicate negotiations with the representatives of those companies have been conducted.

The resolutions were severely criticised and the management condemned by some of the stockholders, after which it was agreed that the annual report be published hereafter two weeks before the annual meeting.

The Volcanic Oil & Coal Co. have declared a dividend of 25 cents per share.

Pennsylvania Anthracite Coal Co.—Fifty shares of this company's stock sold on the 14th inst. at $71 per share.

Pennsylvania R. R. Co.—An adjourned annual meeting of the stockholders of this company will be held March 25.

Catawissa Railroad Co.—The annual meeting of the stockholders of this company will take place April 2.

Lehigh Valley Railroad Co.—A quarterly dividend of 1 per cent. has been declared on the stock of this company, payable on and after April 15.

The Mount Farm Coal & Oil Co. announces a dividend of 2 per cent.

AUCTION SALES.—*Delaware & Raritan Canal Co.*—$1,000 of the 6 per cent. bonds due 1889 @ 100 per cent.

Mine Hill & Schuylkill Haven R. R. Co.—46 shares at 46¼@46.

Huntingdon & Broad Top M't R. R. Co.—$1,000 of the bonds of this company coupon on from October, 1867, inclusive, @ 28¾ per cent.

Copper Stocks.

Reported by WILSON W. FAY & Co., Brokers in Mining and Miscellaneous Stocks, Room 7, Traveller Building, 31 State street.

BOSTON, Wednesday Evening, March 13, 1878.

The general tone of the market is better than last week, the stocks stirring up in a most satisfactory manner, and showing numerous chances for investments, which, if the present state of the market continues, can hardly fail to prove valuable ones, as the whole market is firm, and the chances of a general rise better than they have been for some time. The worthless stocks which have been like a drag upon the market, are rapidly going out of sight, and nobody is sorry but those who own the stocks, and the directors of the companies who have reaped fat assessments from them, and we do not doubt that the stocks of actual value, when once fairly relieved of this weight, will rise to the places where they properly belong.

Calumet & Hecla has advanced and sold at 180, and closes firm at 179 bid and 180 asked.

Copper Falls has declined, and with the help of some pretty heavy "washes" went down to $1, but as the game didn't work well, there being very little stock drawn out, it immediately reacted and sold up again to 1⅞, and closes quiet at 1⅛@1⅞.

Franklin is firm at 7 bid and 7¼ asked, and sales at 7¼, favorable news having been received from the mine.

Osceola is steady at 11¾@12, and sales at 12.

Pewabic remains unchanged.

The new stock of Quincy is on the market, and is meeting with favor, evidently, as the market has advanced ½ per cent. and closes at 17½@18.

Ridge took a spurt during the week and sold at 2.00, but immediately fell off again to 1⅜@1¾.

Duncan is looking better, but closes a trifle weak at 1 11-16@1 13-16.

International holds firm at 35 bid and 40 asked, and little stock offering.

Merrimac silver is quiet.

Copper Products.—The following are the products of the reporting mines for February:

Calumet & Hecla	1,241 tons	1,630 lbs.
Quincy	130 tons	940 lbs.
Allouez Tribute Co	60 tons	385 lbs.

The Saginaw Copper Mining Company has levied two assessments within the past three months—one of $10,000, payable Dec. 20, 1877, and one of $10,000, payable March 20, 1878.

Gold and Silver Stocks.

NEW YORK, Friday Evening, March 15, 1878.

The business in the mining exchange during the week has been quiet as compared with the transactions of a few weeks back. The feature has been the calling of the Plumas National Quartz Mining Company's stock. It opened at $3 on Monday, steadily advancing and reaching $3.25 that day, and with an upward tendency, touching $3.40 to-day, at which the last sale was made. The total transactions in this stock aggregate 13,900 shares, but from the lack of confidence expressed in it, we are inclined to think that the public has taken but very little part in the business. American has been more active this week, the sales having reached 2,330 shares at 9½@11¼. By an oversight we omitted to mention in our last that this company had declared a monthly dividend of one per cent. payable on and after March 11. The dealings in Moose have been very small as compared with its past record, having reached but 3,600 shares at fairly steady prices. New York and Colorado has steadily declined from $2.55 on Monday to $2.10 to-day, the sales for the week footing up 1,700 shares. One thousand shares of King's Mountain sold on the 9th at $2@$2.05. The fractional currency stocks have had their usual business: American Flag, 7,200 shares at 23c.@18c.: Bertha and Edith 46,700 shares, 18c.@13c., and Lacrosse, 68,050 shares at 78c.@62c.

The Gold Placer Mining Company did not have its stock called this week, as was expected. It is now said that it will be called on Monday. Sales are reported as being made in a quiet way at $3.50@$3.75. The owners of this stock, if we can credit their prospectus, are showing unexampled generosity, for, after stating that they have such an immense property that they have concluded to sell—and have actually sold a portion of it—they say: "The proceeds of the property sold will go as dividends to the Gold Placer Mining Company stock, and will amount, according to present negotiations, to fully $10 per share." In other words, you pay a quarter, and every package is guaranteed to contain a prize valued at not less than a dollar.

To get the public to take an interest in mining stocks it must be given some chance—some opportunity to make money from its investments. So far, it has not had this experience. If the hard-pan owners of mines would pay some reliable expert, well-known in New York, to report upon their mines, and if these were found to be of value, the owners could organize as a company at the actual cash valuation, a great deal more money would be invested, and the public would be much better satisfied. As it now is the owner of a partially-developed mine worth say about $30,000, wishes to dispose of his property; he determines upon a plan of organization on a basis of $500,000 capitalization. He first requires a report for which he gives, say, $25,000 stock. It is usually made by some one *well known* in that particular mining camp, but perhaps unheard of in other portions of the world. The next move is to secure a respectable board of directors, president, etc., who also become the promoters, guarantee to secure a market for the stock, etc. To these there will be given, perhaps, $150,000 of the stock or a call at about its cash valuation. The result of all this is that by the time the public is offered a show, the money has all been made by the intermediates, and the final buyer of the stock has but a poor chance for getting his money back, except the mine should eventually prove a valuable one—the most of the stock speculations being made before the mine has become fully opened.

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. Mar. 9.	Mar. 11.	Mar. 12.	Mar. 13.	Mar. 14.	Opening. Mar. 15.
Alpha	10	10	10	9¾	9¾	....
Belcher	4	4	4¼	4	3½	....
Best & Belcher	20½	21¾	22¾	22	18¾	....
Bullion	5½	5¼	5¾	5¼	5	....
Caledonia	2½	2½	2½	2½	2½	....
California	30	31¾	32¼	32	29¾	....
Chollar-Potosi	32½	33¼	34¼	33	30	....
Con. Imperial	....	....	....	....	....	....
Con. Virginia	23¾	23¼	23¼	23½	19¼	....
Confidence	4	4½	4¾	....	....	....
Crown Point	5½	5½	5½	5½	5½	....
Eureka Con	39¼	36¼	37¾	39	36½	....
Exchequer	3¾	3¾	3¾	3¾	3	....
Gould & Curry	8½	8½	9¼	8½	8¼	....
Grand Prize	5½	7¼	8	7	6¾	....
Hale & Norcross	9¼	9¾	9¾	9¾	8¾	....
Julia	2¼	2¼	2¼	2¼	2¼	....
Justice	8½	8½	8½	7¾	5¼	....
Kentuck	3½	3½	3½	3¾	3½	....
Mexican	13¾	14½	16¾	14	12¼	....
Northern Belle	9½	10	9½	9¼	9¼	....
Ophir	53¼	54¼	64	54¾	34¾	....
Overman	13¼	16¾	17¼	15¼	14	....
Raymond & Ely	4¾	4½	4½	4½	4	....
Silver Hill	2¼	2¼	2½	2¼	1¾	....
Savage	10¾	11	12¼	10¼	9¾	....
Seg. Belcher	27	27	27	27	27	....
Sierra Nevada	4¼	4¼	5	4¼	3¾	....
Union Con	5¾	6	7¼	6¼	6¼	....
Yellow Jacket	10	10	10½	9¾	9	....

The San Francisco stocks are receiving but very little attention in this market, and a very suggestive warning to the danger attending operations in them is conveyed in the course of the quotations given above. A gradually improving market was manifested in San Francisco for some time past, and up to the 12th inst., Ophir on that date having advanced to $64 per share probably on the supposition of a continuance of the bonanza within its limits. Yesterday's quotations, however, seem to dispel this hope, this stock having declined $30 per share within the two days, the final sales being at $34¾. The whole market declines more or less in sympathy with this. California, Chollar and Consolidated Virginia have, within a day, gone down $3 per share each, and even those stocks outside of the Comstock, and presumably not in the ring, are lower.

The Sutro Tunnel vs. The Cost of Pumping.—The *Sutro Independent* contained an article recently, giving estimates of the area draining into the Comstock mines, the average rainfall, and the expense of pumping this water to the surface, and the conclusion is reached that the total cost, including interest on money invested, damage by floods and delays in working the mines, amounts to $4,644,000 per annum. The *Independent* goes on to say: "If the flow of water in the mines and the present actual expenditures do not quite come up to the above figures, they surely will, long before they all reach their 2,500-ft. levels.

"The mining companies claim that there are not over 200 miner's inches pumped from the mines at the present time. We do not know whether this is correct or not, but think it to be far below the mark. But let us suppose it to be correct, the expense would even then foot up 56 per cent. of the above sum, and the direct cost would amount to $3,612 per day, $108,360 per month, and $1,300,320 per annum, while adding the indirect cost, the total expenses will then figure up $7,224 per day, $216,720 per month and $2,600,640 per annum.

"The level, 2,500 feet from the surface, where the full flow of water will be experienced, is the point at which the mines will have to be abandoned, provided the Sutro Tunnel does not come to the rescue by creating a new surface for the discharge of water, and thereby adding 1,645 feet to the possibility of carrying on mining operations on the Comstock lode."

It is anticipated that the Tunnel will reach the Comstock lode by the middle of August, 1878, the present rate of progress averaging about 7½ feet per day.

Malachite Mining Co. of Colorado.—300 shares of the stock of this company were sold at auction in Boston during the week at $1 per share.

Manhattan Silver Mining Co. of Nevada.—At the recent annual meeting of the stockholders of this mine, held at San Francisco, the old officers were reëlected. The following items are condensed from the Secretary's report:

Receipts		$1,014,626
Mining expensss	$462,893	
Milling expenses	514,564	
		977,457
Profit		$37,169

There was 5,404 tons of ore produced and milled, assaying $204.18 per ton, and yielding 91.73 per cent. of the assay value. The cost of milling was $29.45 per ton against $11@$12 at Virginia. The Manhattan is a silver mine, and the item for discount, exchange and interest was $148,793. There was also $140,228 paid for custom ores.

The Kansas City (Mo.) Mining Stock Board—A contemporary observes: "This institution has been organized with view to the mutual advantage of the mine owners of the great gold and silver mineral belt, extending along the eastern slope of the Rocky Mountains, from the British possessions to Mexico—particularly of the mine owners of Utah and of the San Juan and Black Hills countries—as well as the owners of the lead and coal deposits nearer home—and of the business and commercial community of the city in which it is located."

The Watt Grave! Mining Co. (G. V., Cal.) has levied its first assessment of 15 cents per share.

The Hidden Treasure Gold Mining Co. declared its first dividend on the 16th inst.

The Black Bear Quartz Mining Co. has declared its usual monthly dividend.

Gas Stocks.

NEW YORK, Friday Evening, March 15, 1878.

There is no demand for gas stocks, and consequently no sales. The market is very weak, and we still continue to lower quotations, notably that of the New York Mutual, which is offered at $70 per share, against $95 on the first of the year. This is equivalent to a decline of $1,250,000 in the market value of this stock within a period of ten weeks. This remarkable decline is influenced by the successful encroachments of the Municipal Company upon the territory heretofore supplied by the Mutual, and also by the announcement of the reduced dividend of 1½ per cent., which is declared payable on the first of April, equal to the annual rate of 6 per cent., instead of 10 per cent., as customary heretofore.

The price of gas in Zanesville, Ohio, is $2.25 per thousand, with 10 per cent. discount to consumers of 11,000 feet per month. The ordinance of the Cincinnati Council fixes the price at $1.75, and in Indianapolis, Ind., the price is $2. Sandusky, Ohio, pays $3.

The proposed new gas ordinance for Cincinnati provides for the appointment of five additional policemen, whose special duty shall be to light, extinguish, clean, keep in good order, and protect the street lamps, and when not so engaged, said police to perform regular police duty as the other police, and to receive the same pay as regular police, and be recommended by the marshal and committee on gas.

Paducah, Ky.—The gas company at this place has reduced the price of gas to $2.50 per 1,000 feet.

Montreal Gas Co.—We note recent sales of 75 shares of the stock of this company at from $148¾ to $149 per share.

Boston Gas Co.—We note recent auction sales of this company's stock at $810 per share.

The following list of Companies in New York and vicinity is corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad street, New York:

COMPANIES IN NEW YORK AND VICINITY.	Capital Stock.	Par.	DIVIDENDS. Rate per ann.	Am. of last.	Date of last.	QUOTATIONS Bid.	Ask'd
	$		P. ct.				
Mutual, N. Y.	5,000,000	$100	10	1½	Apr., '78	60	70
" Bonds	90,000	1,000	7	3½	Feb., '78	....	102
N. York "	4,000,000	100	10	5	Nov., '77	115	120
Metrop. "	2,500,000	100	10	5	Feb., '78	128	132
" Certfs.	1,000,000	.....	7	3½	" '78	100	103
" Bonds	500,000	1,000	7	3½	Dec., '77	102	....
Harlem "	1,850,000	50	8	3	Feb., '78	90	95
Manhat. "	4,000,000	50	....‡	5	" '78	200	204
Brooklyn, Bkln.	2,000,000	52	15	5	Dec., '77	155	165
Nassau	1,000,000	25	....‡	3	Jan., '78	70	80
" Certfs.	700,000	1,000	7	3½	Nov., '77	....	101
People's	1,000,000	10	....‡	3½	Jan., '77	25	40
" Certfs.	300,000	1,000	7	3½	Jan., '78	80	85
" Bonds	325,000	.....	7	5	Feb., '78	96	100
Metrop. "	1,000,000	10	5	2½	Nov., '77	68	72½
W'msb'g "	1,000,000	50	10	2	Jan., '78	100	105
" Certfs.	1,000,000	.....	7	3½	July '77	100	102
Citizens'	1,200,000	20	....‡	3	Jan '78	81	85
" Certfs.	320,000	1,000	7	3½	Oct., '77	97	100
J. C., N. J.	750,000	20	10	5	July, '77	160	....
Cen. Watch. N.Y.	466,000	50	7	4	July, '77	70	....
Subur'n, "	295,000	50	7	3½	Oct., '77	....	95
Municipal, N. Y.	1,500,000	100	.....	.....	.....	90	100

‡ Paid irregularly.

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